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Garages and Motor Boat Houses

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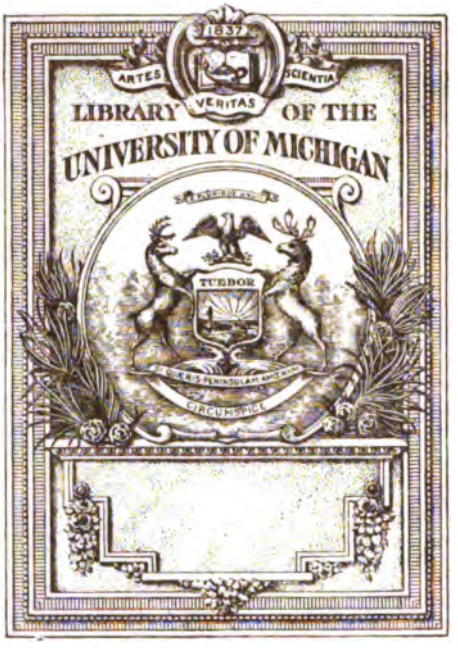
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Garages and Motor Boat Houses

GARAGE CONSTRUCTION

GARAGE EQUIPMENT

Comprising a large number of designs for both private and commercial buildings. Showing the latest ideas in their planning and construction. For the country, suburban towns and cities. Also motor boat houses. The designs are contributed by architects from different sections of the United States

COMPILED BY

WM. PHILLIPS COMSTOCK

Editor of the "Architects' and Builders' Magazine"

NEW YORK

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305173

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Introduction

THE garage as the most modern of structures presents a problem to architects and draughtsmen with which they have had less experience than with any other form of building. In addition, the precedents which they may follow are not so clearly defined, nor so inviolable as is the case with other buildings. Yet this style of structure possesses requirements of a distinctive character, and usually of extreme simplicity, and in order to meet these requirements satisfactorily all that is really necessary is a liberal application of the laws of common sense.

While the minor details essential to efficiency, of course, differ in cases of private and public garages, there are certain basic principles which should be observed in all designs of this character.

Briefly summarized, the chief desiderata to be sought for in a garage are the following: First, absolute protection from fire; second, an efficient meeting of the needs of the owners; and third, a convenient arrangement of the various utilities.

As regards the first of these essential features, it is always possible to design a structure which shall be absolutely proof against danger from without, and the fireproof materials which are available for this purpose are so well known as to not require mention here. Many wooden garages for private use are of course being built, but the insurance companies distinctly disapprove of them, and certainly the danger of fire is much increased when cars are stored in frame buildings. Then, too, there is the danger to adjoining property.

To absolutely protect from danger within is not always possible, but it is always possible to greatly minimize this danger. The principal cause of fire within the garage is a leaking gasoline tank, hence the building should be so planned that all waste gasoline should be properly drained off and discharged into the ground, where it is harmless. The floor should be and almost invariably is, of concrete, finished if desired with cement. Many small garages are finished with a shingle roof, but this material is not to be com-

mended. Tiles, or slate, or any of the non-combustible roofing materials will prove more satisfactory in the end. A large structure may easily be designed so that in case of an explosion or fire from any cause, the fire can be confined to one room and permitted to burn itself out without injuring anything save the contents of the room in which it occurs. The requirements of the Board of Fire Underwriters of the various cities of the United States are usually amply protective when honestly met, but frequently, in pursuance of a "penny-wise, pound-foolish" plan, effort is made to avoid rather than meet the requirements.

A question which should be well considered before the plans are drawn is the matter of gasoline storage. In the case of the large commercial garage this question becomes a vital one and frequently tests the ingenuity of the architect to the utmost. An instance is given in this work where a saving of $30,000 a year in insurance premiums was effected for the owners by the clever arrangements for storage devised by their architects. In the case of the small private garage, however, this matter is left more to the discretion of the owner. By far the safest way is, of course, to sink the tank in the ground some distance from the garage. Many owners, however, are unwilling to incur the additional expense which this method involves, and the next safest way is to build a platform outside the building for the gasoline tank, with a pipe connection through the walls to the inside. The fuel is thus kept outside of the building, and as the gasoline is supplied by gravity, there is nothing about the apparatus to get out of order. The last and least desirable method of storage is to simply keep the tank in some convenient corner within the structure. Many insurance companies refuse to allow a quantity of more than five gallons to be thus stored.

As to the size of the private garage, that is a point to be decided by many varying conditions. It seems, however, unless absolutely necessary to do so, inadvisable to build a one-car garage. It is certainly inhospitable, much like building a house wherein no provision is made for an occasional guest. A visiting car cannot be housed in a one-car garage. Economically considered, and this is especially true of suburban towns, it is always possible to rent the space not needed by the owner, thus making the building practically pay for itself.

PART I

Private Country and Suburban Garages

WE will first consider non-fireproof structures; the frame building and the stucco finished structure on wooden framing, equally subject to destruction from fire within. These modes of construction though attractive are hardly to be commended.

A good example of the very tiny garage designed for one runabout car, is that owned by Mrs. Mary A. Clapp, and planned by C. E. Schermerhorn. The dimensions, 12 feet by 16 feet, allow sufficient space for work benches and an aisle two feet wide around the car. It is of extremely simple architecture, the roof and the doors saving it from the appearance of a large packing box. It is of frame construction with shingled sides and roof, and the floor is of concrete. The cost was $1,600.

The small garage at 448 Ridge Street, Newark, N. J., built from plans drawn by William D. Jones, is also an example of wood construction. The balloon frame is clapboarded on the outside, with a shingled roof. The interior is left unfinished. The floor and approach are concreted and the size is sufficient for one car.

The needs and requirements of a garage are sometimes so simple that the services of an architect are not necessary. When the prospective builder of such a structure has a definite idea of the building he desires to construct, it is quite possible to erect it without other plans than those a capable carpenter can make. In proof of this we show two garage buildings at Larchmont Park, N. Y. That on the right belongs to Mr. Chambers, and was planned by him with the aid of his carpenter. It is a frame structure with shingled sides and roof. It will house two cars.

It is, however, unfortunate for both buildings that their respective owners should have placed them side by side; they form an inharmonious group. Had they been placed a suitable distance apart, the appearance of either would have been much enhanced.

GARAGE FOR MRS. MARY A. CLAPP AT OAK LANE, PA.

C. E. Schermerhorn, Architect

GARAGE AT 448 RIDGE STREET, NEWARK, N. J.

Wm. D. Jones, Architect

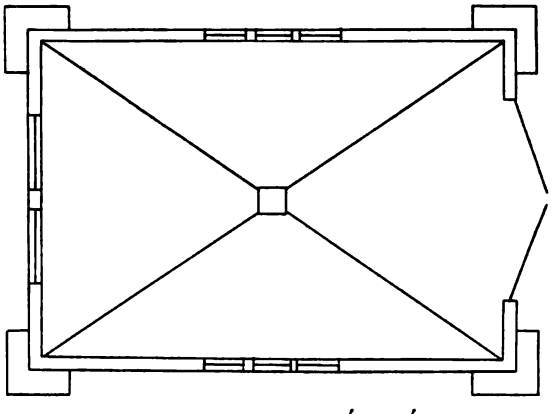
FRAME GARAGES AT LARCHMONT PARK, NEW YORK

GARAGE FOR MR. C. H. WILSON, EAST ORANGE, N. J.

This is a point unfortunately too much neglected by suburban builders and their architects. It may seem an absurdity, especially in this land of individuality, for a man to design his house or his garage to harmonize with that of his neighbor, but it is nevertheless true that if the architect or owner, or both, would curb the wild riot of individual fancy, and consider a little the natural and artificial limitations of the particular spot to be "improved," our suburban towns would not present the peculiar, not to say absurd, appearance they often do.

The garage erected at 68 Beach Street, East Orange, N. J., for Mr. C. H. Wilson, is another instance offered in proof that, so far as a small garage is concerned, the architect may be dispensed with. A cut and a description published in a magazine furnished the inspiration from which Mr. Wilson, with the aid of the carpenter who built the garage, sketched the plan. Since many of the smaller garage buildings are little more than large boxes in design, the matter resolves itself into a choice of materials and appliances. This particular building is a frame structure with a shingled roof finished with a ventilator. The floor is of concrete. It is well lighted and there is abundance of room for two cars.

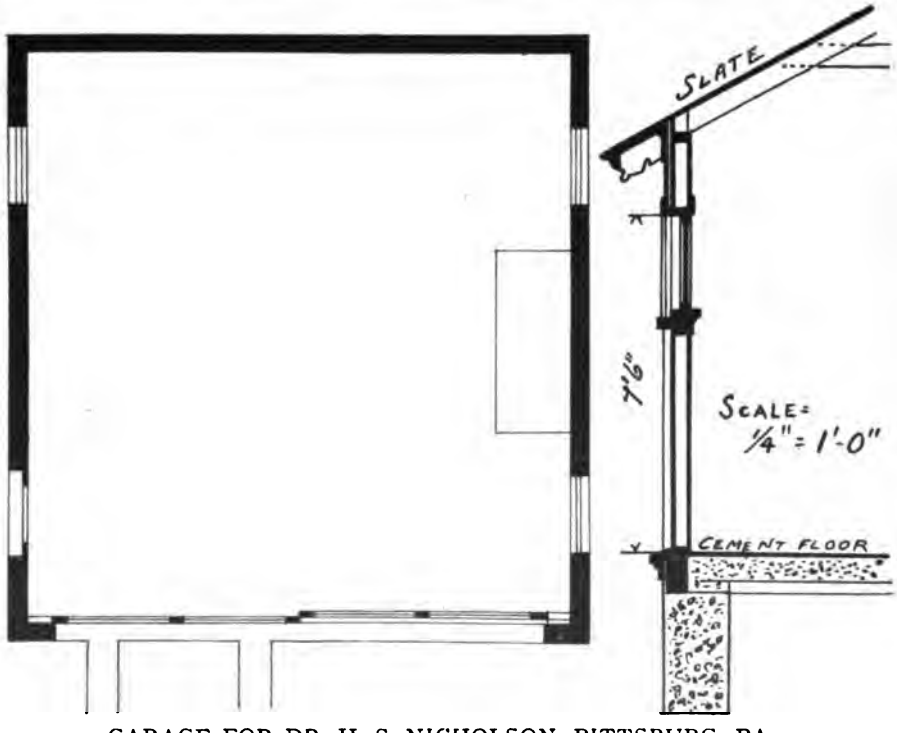
GARAGE FOR DR. WM. GAUCH, CORNER OF ELWOOD AVENUE AND MT. PROSPECT AVENUE, NEWARK, N. J.



INSIDE DIMENSIONS 13′ x 19′

GARAGE FOR MR. THERON H. DEYO, N. E. CORNER OF BERKELEY AND CLIFTON AVENUES, NEWARK, N. J.

Wm. D. Jones, Architect



GARAGE FOR DR. H. S. NICHOLSON, PITTSBURG, PA.

R. M. Trimble, Architect

GARAGE ON RIDGE STREET, NEWARK, N. J.
John H. and Wilson C. Ely, Architects

GARAGE ON SUMMER AVENUE, NEWARK, N. J.

GARAGES AND MOTOR BOAT HOUSES

The garage for Mr. Theron H. Deyo is designed in keeping with the residence which it adjoins. The little building is of frame construction, sheathed, covered with water-proof building paper and furring strips which carry the wire mesh upon which the concrete stucco is placed. While this method of construction gives the appearance outwardly of a fireproof structure, it possesses no particular advantage over the frame building. It has a shingled roof on a wooden frame. The plan which we show herewith, while of the simplest, is of value in that it gives the dimensions suitable for one large car.

A garage such as the one described above may be made comparatively fireproof if the inside of the structure, including the ceiling, is stuccoed with cement in a manner similar to the outside. This entirely encloses the wood and the danger from ignition from a gasoline blaze is minimized.

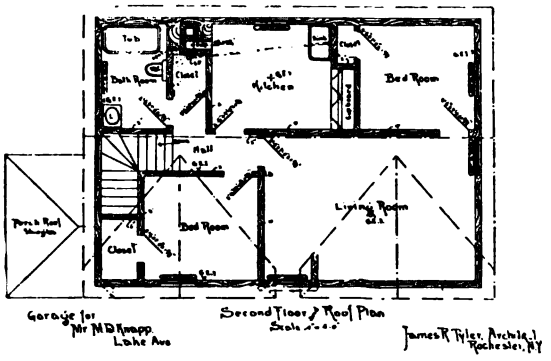
The garage for Dr. H. S. Nicholson at Pittsburg, Pa., was designed by R. Maurice Trimble. It is a wood framed and cement stucco finished building, of a size suitable for two cars. Its outside dimensions are 19 feet by 20 feet. The front has an opening of 16 feet 4 inches, closed by two doors, both sliding, one behind the other, so that either side may be opened, but only one at a time. The footings are of concrete and the bed of the garage is concrete with a cement floor. Both exterior and interior are cement finished, and the roof is of slate. The section shown in the illustration explains the construction.

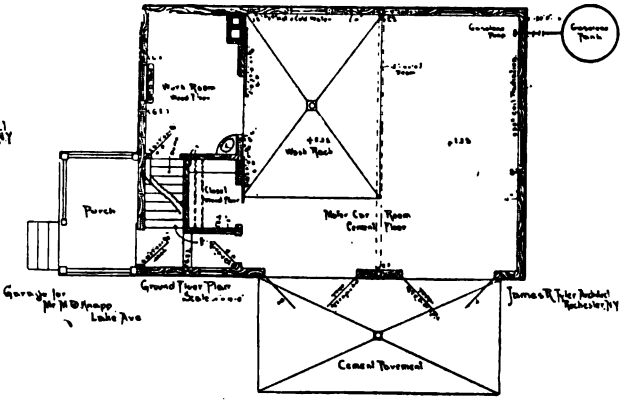
The attractive building designed by Mr. James R. Tyler for Mr. M. D. Knapp, is built of timber for the first story, while the upper part is of stucco construction. The second story contains a living room, kitchen, two bedrooms and bath. On the ground floor there is ample accommodation for motors and a good sized work shop. The floors are of cement, and the building is equipped throughout with a hot water heating system.

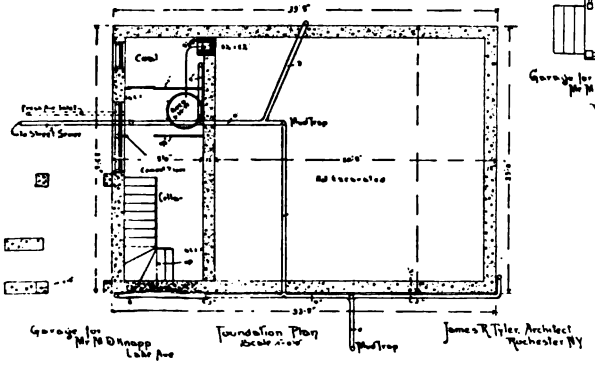
Three other stucco-finished garages are shown on pages 10 and 13. They are all in Newark, N. J. The one for Dr. Gauch is a single car garage of stucco, making an unobtrusive appearance in the rear of his residence. The garage on Ridge Street is designed for two cars, and is in harmony with the residence to which

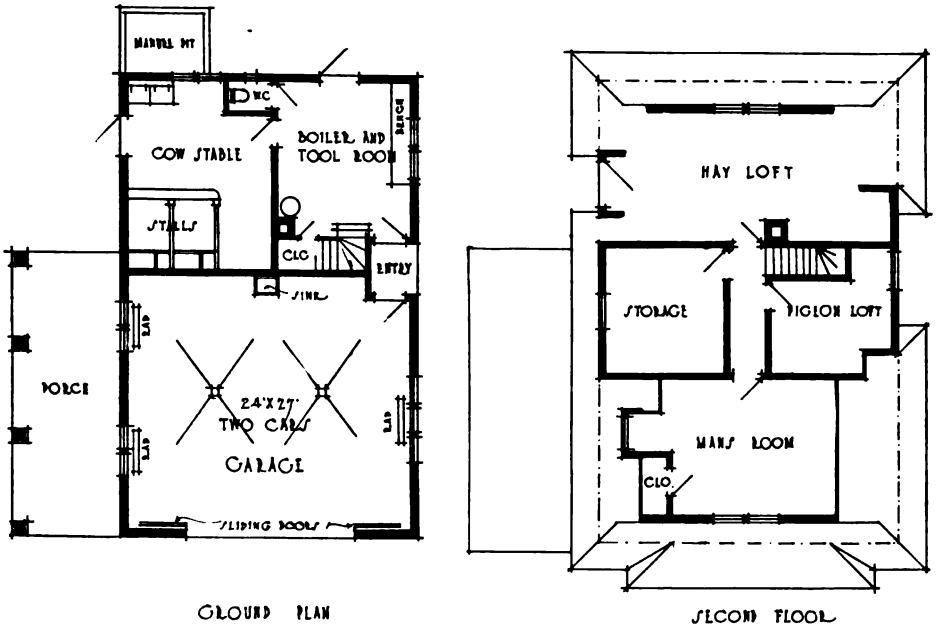
GARAGE FOR MR. M. D. KNAPP, LAKE AVENUE, ROCHESTER, N. Y.

James R. Tyler, Architect







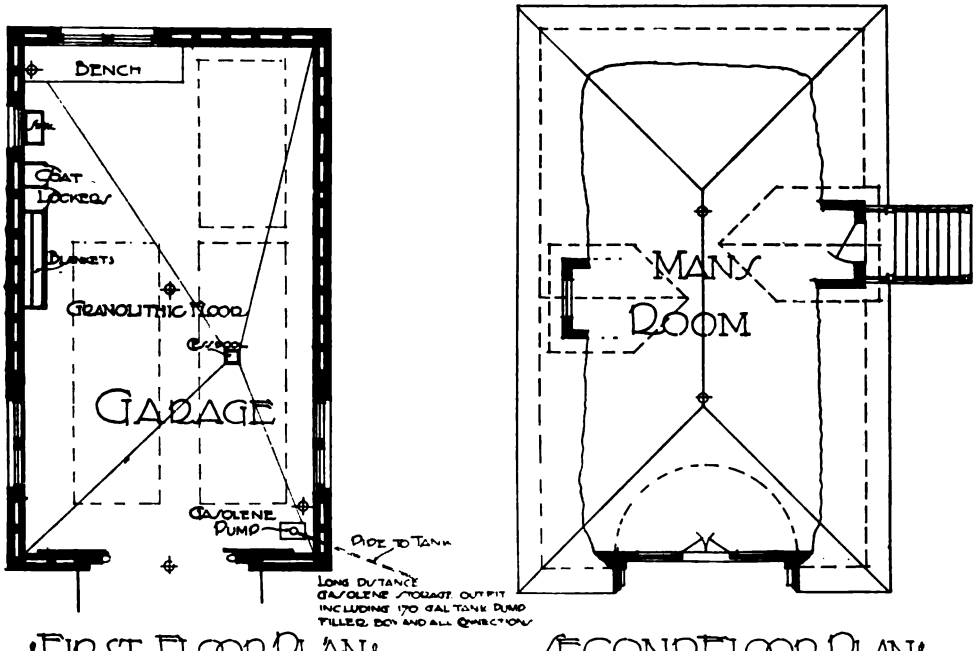


GROUND PLAN

SECOND FLOOR

GARAGE FOR MR. ALBERT L. BAILY AT HAVERFORD, PA.

Baily & Bassett, Architects



FIRST FLOOR PLAN

SECOND FLOOR PLAN

GARAGE FOR A. C. LAWRENCE, MARBLEHEAD NECK, MASS.

Kilham & Hopkins, Architects

it belongs. A still larger garage is that on Summer Avenue. This is also finished in stucco with a shingle roof.

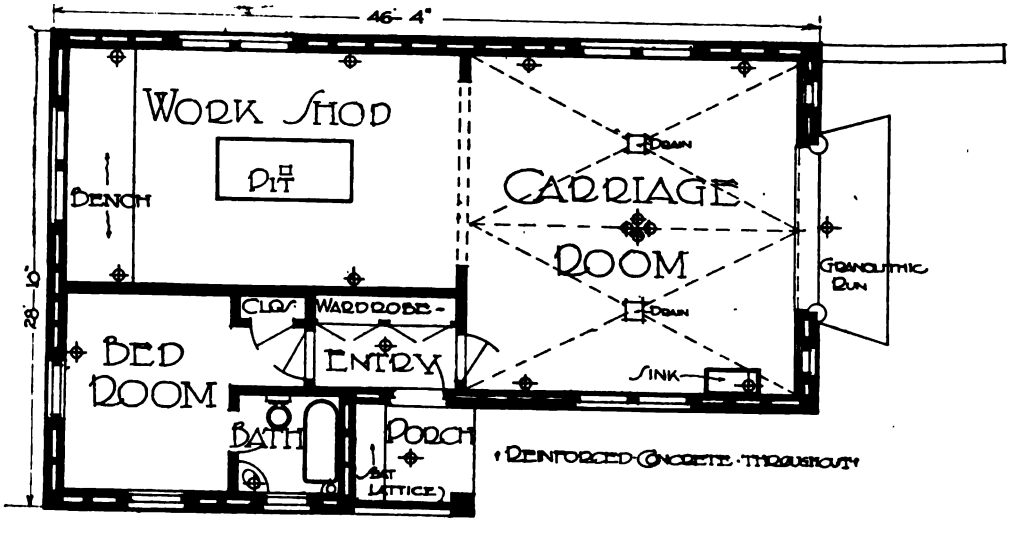
Often the garage furnishes a convenient nucleus around which a number of out-buildings may be gathered under one roof. A combination of garage, boiler room, cow stable and tool room on the first floor, and man's room, hay loft, storage room and pigeon loft on the second floor, is the arrangement provided by Baily and Bassett for Mr. A. L. Baily at Haverford, Pa. Expanded steel lath is used on all walls as a semi-fireproof construction, and an outside vestibule separates the garage proper from the hot water heater. The front doors slide past each other on a double track so that the whole space of 14 feet can be open at one time. A ceiling washer, wash tray, work-bench and efficient grease drainage, lighting and ventilation are part of the plan. A side porch for carriage or car is not only a convenience, but adds to the general outline of the building.

Very attractive in its simplicity is the rather small, two storied garage which was erected for Mr. A. C. Lawrence at Marblehead, Mass., from designs by Kilham and Hopkins.

Of concrete construction, with shingled roof and granolithic floor, it has one apartment to the story; on the first floor the garage, and on the second the sleeping room for the man. It will be noticed that the gasoline storage tank is outside the building, and at a safe distance from it, thus greatly minimizing the danger from fire and explosion.

While Mr. Milliken's garage undoubtedly owes much of its attractive appearance to its surroundings, it is in itself a sightly structure of good design. It is a one-storied garage and is built throughout of reinforced concrete. Besides the carriage room and work shop, there is good accommodation for the chauffeur. Messrs. Kilham and Hopkins of Boston, Mass., were the architects.

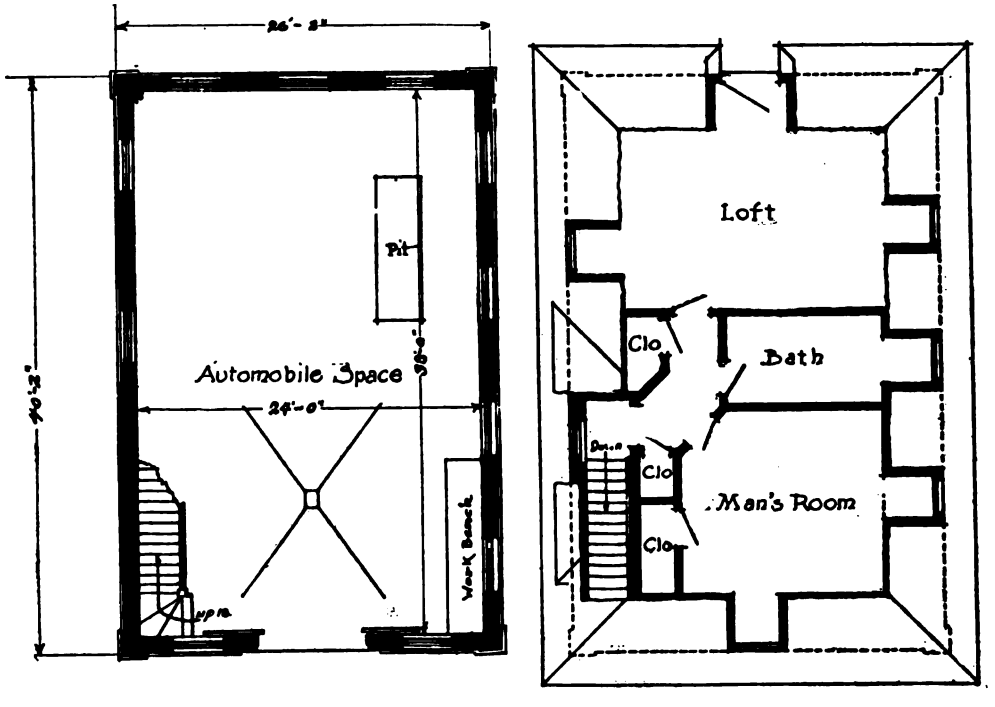
The garage at Wayne, Pa., was designed by the architect, Mr. Boyd, to harmonize with a house built several years previously. The walls are of brick left exposed inside, and roughcasted on the outside, with the exception of the corners which are of Pompeian brick treated in the form of pilasters. The roof is of green slate. There is floor space to accommodate two cars,



FLOOR PLAN

GARAGE FOR A. N. MILLIKEN, COHASSET, MASS.

Kilham & Hopkins, Architects

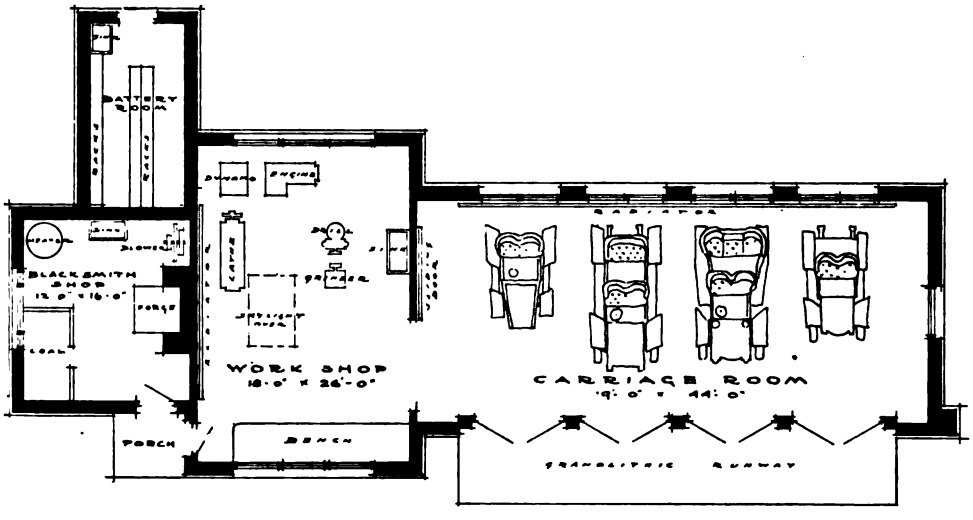


First Floor Plan

Second Floor Plan.

GARAGE AT WAYNE, PA.

D. Knickerbacker Boyd, Architect



GARAGE FOR MR. W. D. DENEGRE, MANCHESTER, MASS.

Andrews, Jaques & Rantoul, Architects

GARAGE FOR MISS MARJORIE R. VAN WICKLE, BRISTOL, RHODE ISLAND
Kilham & Hopkins, Architects

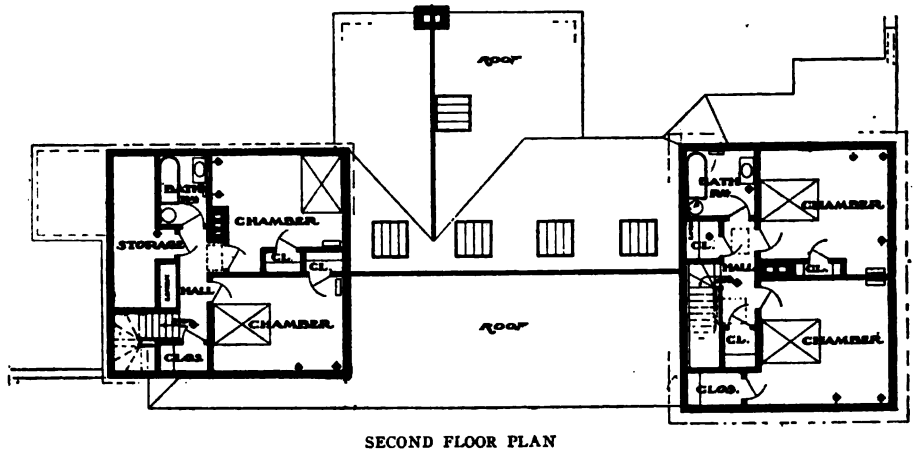
and a large washing space which may be used to store another car if necessary.

Quarters for one man are provided in the second story, with several closets and a large loft.

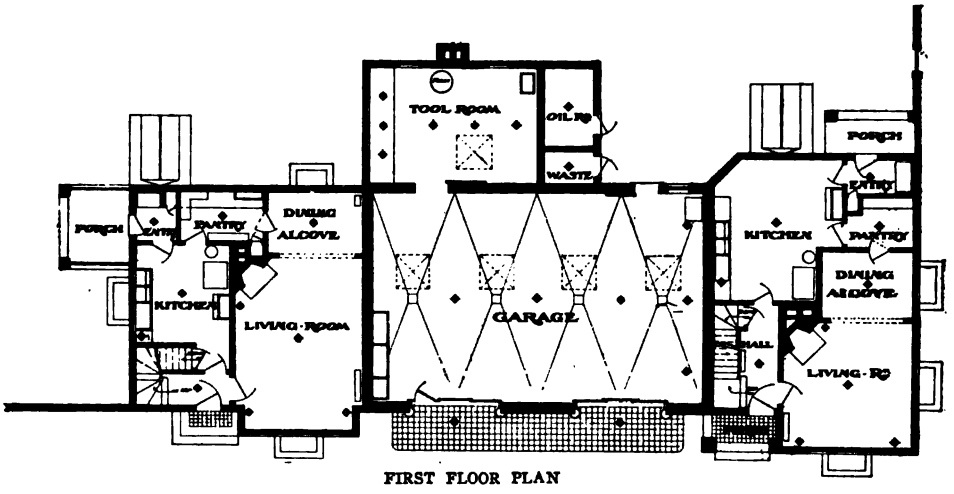
A single storied design of considerable attraction, by Andrews, Jacques and Rantoul, is the building for Mr. W. D. Denegre at Manchester, Mass. Also a concrete structure, the building has a shingle roof. The plan is interesting. Adjoining the garage room which affords ample space for the storage of four cars, there is a large workshop lighted by ample end windows and also by a skylight. Adjoining this is the blacksmith shop, but in a separate room approached only by going out of doors. Still another room, even more isolated, is the battery room, for this garage contains engine and dynamo and storage battery equipment, a plant which would be suitable for charging electric cars.

The garage which was designed by Kilham and Hopkins for Miss Marjorie R. Van Wickle, and which was erected at Bristol, Rhode Island, is an amplification of the garage idea and is an elaborate structure. The exterior is of brick covered with stucco. In plan, it embraces two distinct and separate cottages with the garage between. The cottages are two storied and are completely appointed, each containing five rooms and bath. They are intended for the use of the coachman and the chauffeur. The garage itself is of one story height, and has accommodation for four cars, with a tool room and other appurtenances in the rear.

Although in appearance a continuous building, the garage and tool room at the rear are isolated from the two cottages which

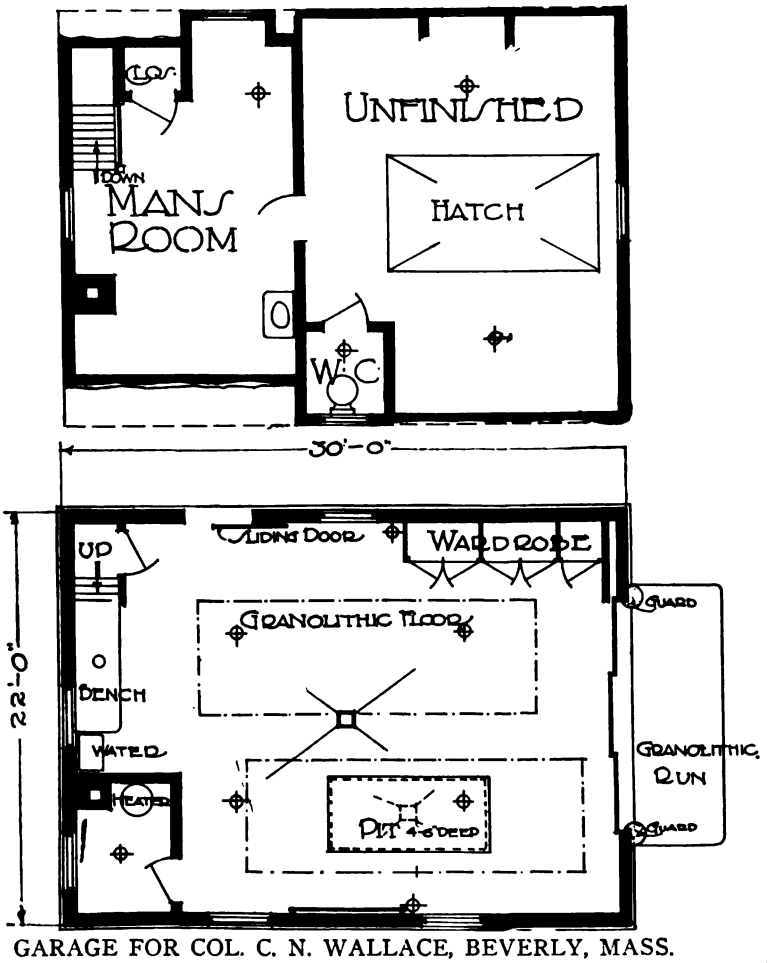


SECOND FLOOR PLAN



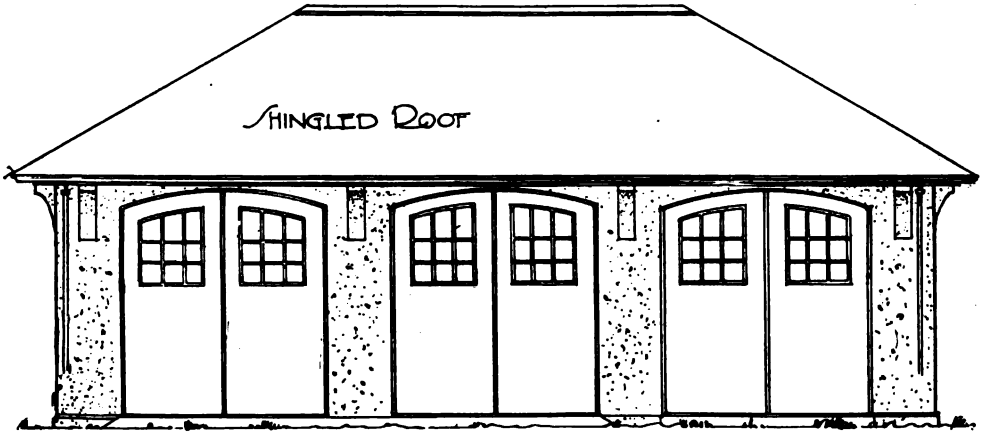
FIRST FLOOR PLAN

GARAGE FOR MISS MARJORIE R. VAN WICKLE, BRISTOL, RHODE ISLAND
Kilham & Hopkins, Architects



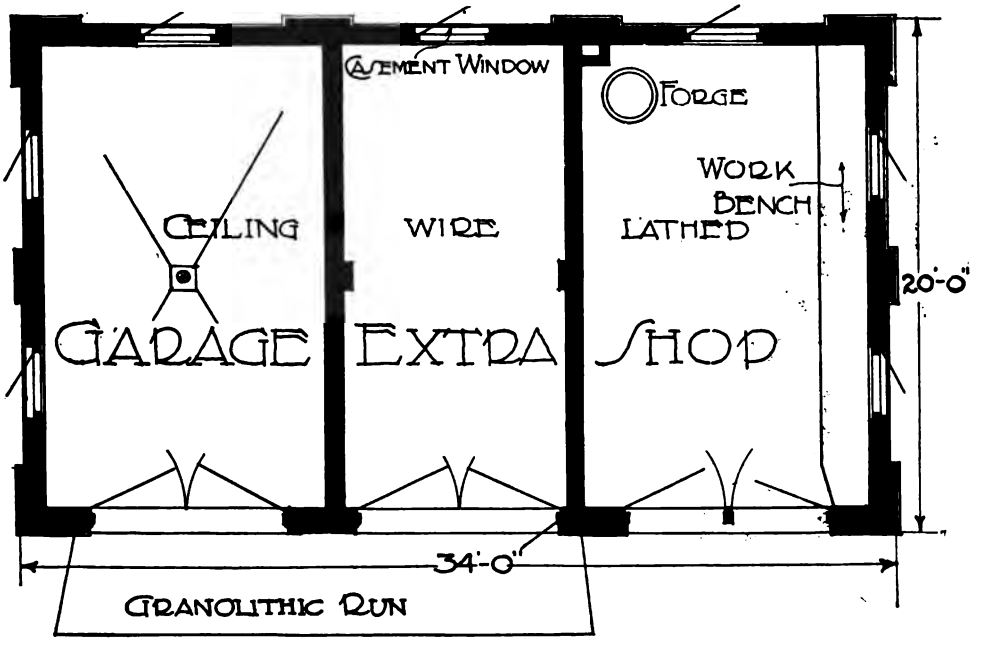
GARAGE FOR COL. C. N. WALLACE, BEVERLY, MASS.

Kilham & Hopkins, Architects



FRONT ELEVATION

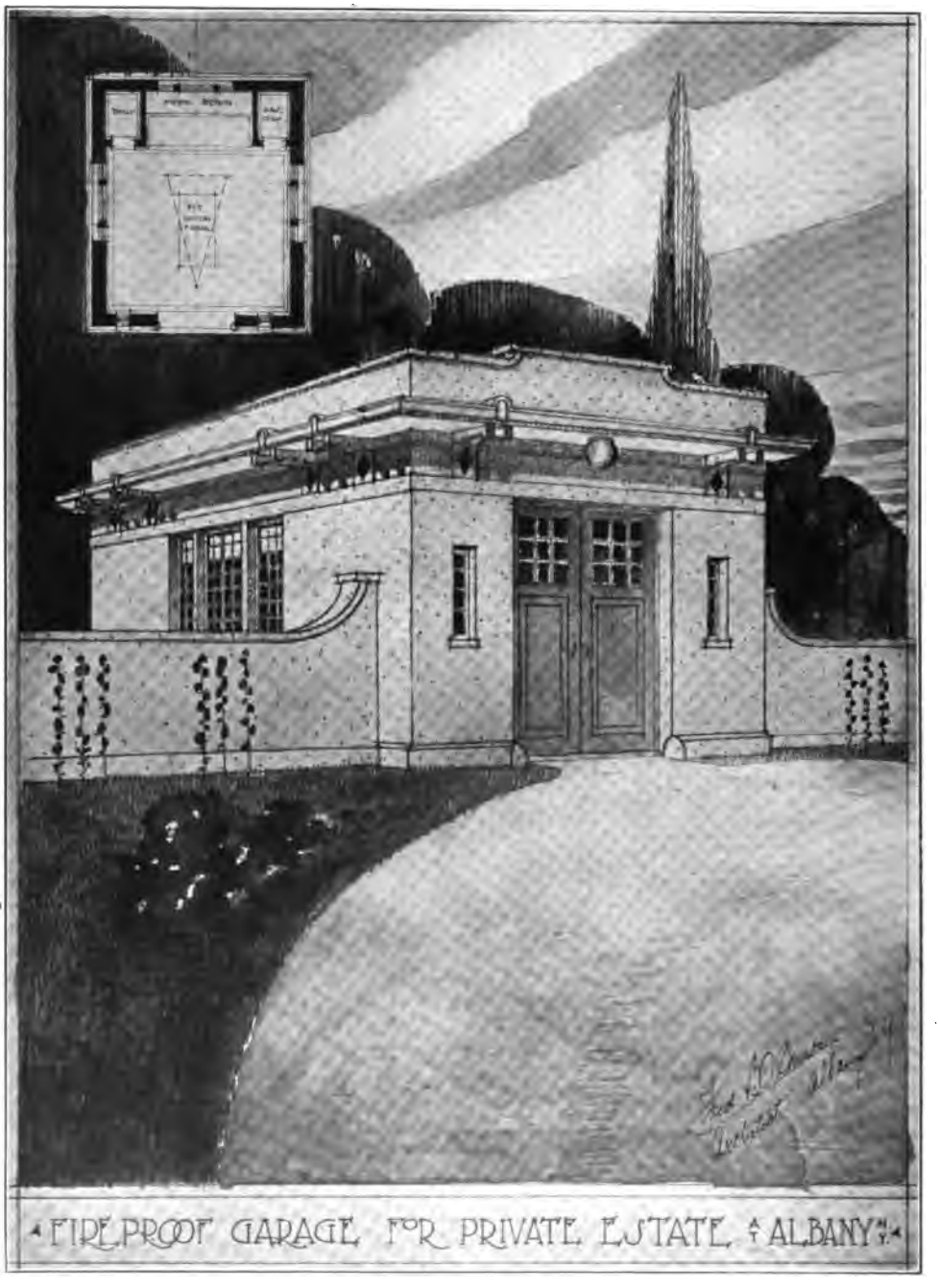
BRICK WALLS CEMENT OUTSIDE



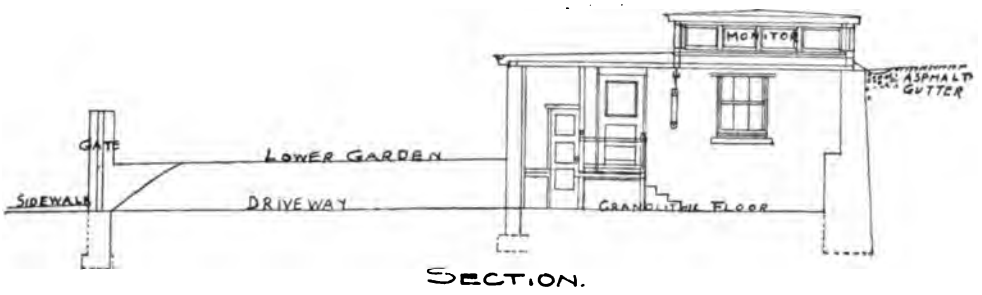
FLOOR PLAN

MOTOR HOUSE FOR J. C. HOPKINS, DOVER, MASS.

Kilham & Hopkins, Architects



Frederick B. O'Connor, Architect



GARAGE FOR SENATOR FOSS, JAMAICA PLAIN, MASS.

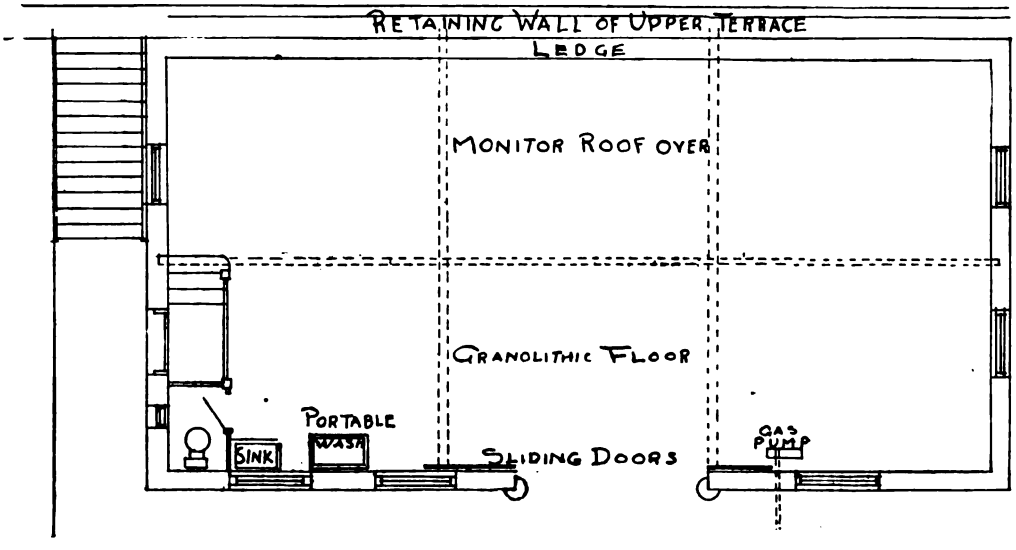
form the ends, as it were, of the structure, by a thick fire wall of brick. There is absolutely no inside connection between the garage and either of the cottages, thus offering considerable hindrance to the spread of a fire from the garage to the adjoining living quarters. Like several of the other buildings, however, this structure has a non-fireproof shingle roof.

A system of semi-fireproof construction to which we have previously referred has been employed by Kilham and Hopkins in building a garage for Colonel C. N. Wallace at Beverly, Mass. The frame is of wooden studding, wire lathed and cement plastered within and without. The roof is of slate, and the floors are granolithic. The accommodation of the garage is well shown by the two plans given.

On Page 25 we show the front elevation and floor plan of a garage designed by Kilham and Hopkins for Mr. J. C. Hopkins of Dover, Mass. The exterior is of brick covered with stucco, and it is one storied. The interior arrangement is entirely given up to the care and storage of autos.

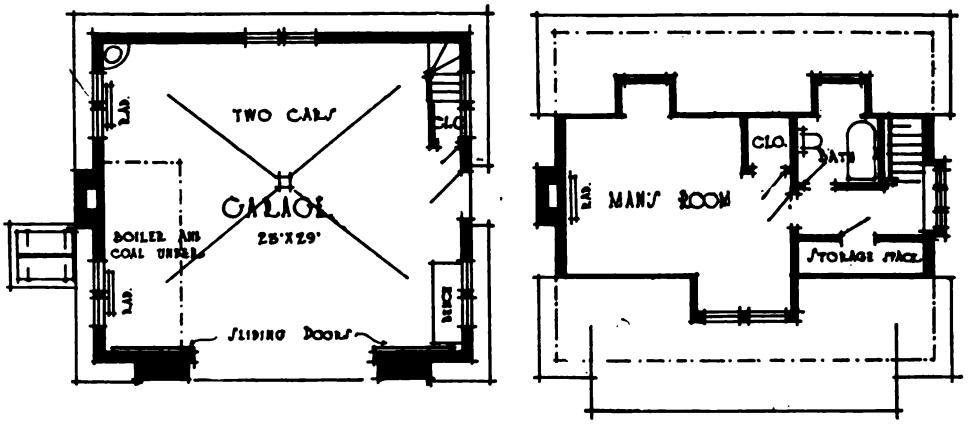
On Page 26 we show a perspective sketch with plan of a garage building which is fully fireproof.

The requirements for this building were that it should be as nearly fireproof as modern skill and ingenuity could make it, and that it should be erected at a cost as small as compatible with first class workmanship. The architect, Mr. Frederick B. O'Connor, believes that he has met these requirements fully. The garage is of simple but prepossessing appearance, the exterior walls being of concrete with a rough finish. A pleasing detail is the colored tile which was used in the panels under the brackets of the cornices.



GARAGE FOR SENATOR FOSS, JAMAICA PLAIN, MASS.

Albert Winslow Cobb, Architect



GROUND PLAN

LOFT PLAN

GARAGE FOR MR. CHARLES W. WELSH, OAK LANE, PA.

Baily & Bassett, Architects

Under the concrete floor is a pit, which is fitted with a movable iron cover, to be used when the pit is not in use. Both pit and floor are well drained. At the end of the garage are the work bench which has abundance of light and is convenient to the car, a tool closet, and a gasoline storage closet. The dimensions, inside, of the garage are 20 feet by 24 feet.

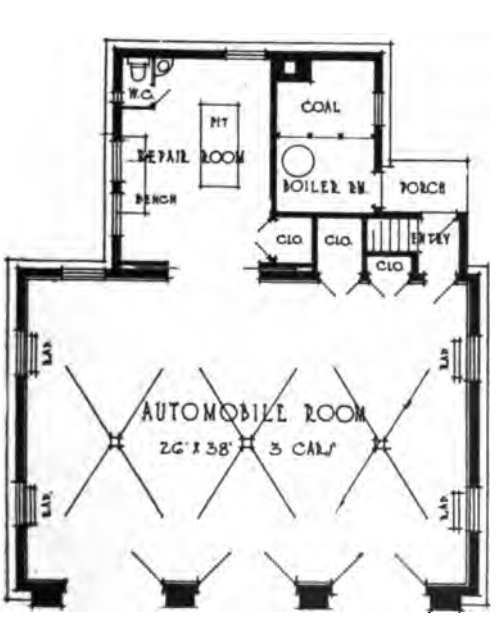
It would be possible to develop this design in wood, at a material reduction in cost, but of course, at a sacrifice of its fireproof qualities.

The garage for Senator Foss at Jamaica Plain, Mass., designed by Albert Winslow Cobb, is a concrete block structure which will contain about three cars. The building is peculiar in that it is built into the side of a hill at the juncture of the upper and lower terrace at the rear of the Senator's home. The floor level is that of the rear street and the roof level that of the upper terrace with a monitor light projecting slightly above. Exterior windows are confined to the front and sides. This arrangement is shown plainly in the plan and section. The building has a granolithic floor and is equipped with a crane carried on a cross girder, making it possible to lift heavy machinery at any point. The gasoline supply is brought by means of a pump in the building from a tank which is 30 feet away.

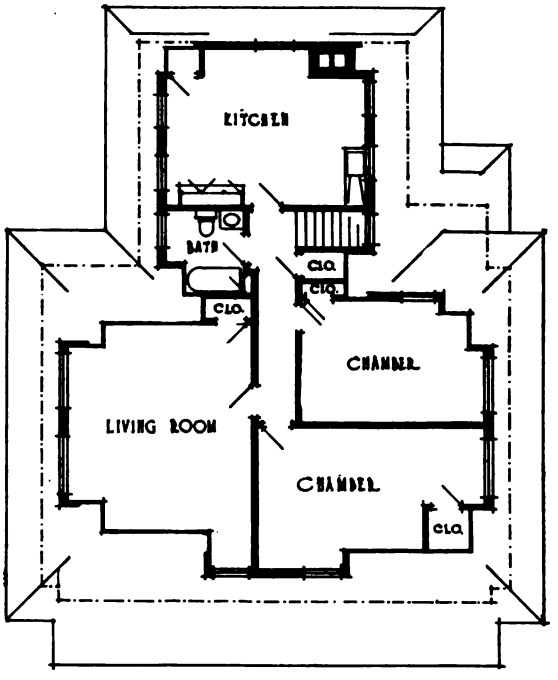
Two garages designed by Baily and Bassett are of interest as they combine the use of stucco finish with stone base and chimney, and piers at the front between the doors. The designs are exceedingly attractive and their setting between the trees adds not a little to the beauty of the picture.

An ideal garage for two cars is revealed in the half-timbered building on Mr. Charles W. Welsh's property at Oak Lane. A heater in a small cellar with reinforced concrete ceiling over it, provides effective hot water heating to the main floor, and to the man's room and bath above. A wainscot and buff sand finish plaster on expanded metal, and dark wood finish, provide an attractive interior.

The garage for Mr. James McCrea at Ardmore, Pa., will accommodate comfortably three large automobiles, and has a large repair shop in the rear with pit, bench, toilet, and an independent



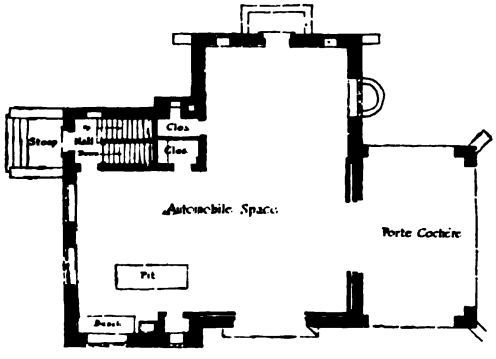
FIRST FLOOR PLAN



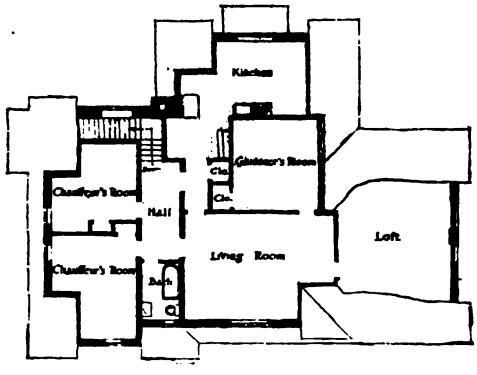
SECOND FLOOR PLAN

GARAGE FOR MR. JAMES McCREA AT ARDMORE, PA.

Baily & Bassett, Architects



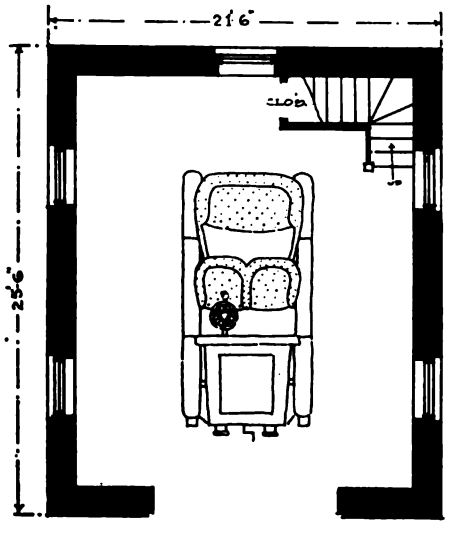
Ground Floor Plan



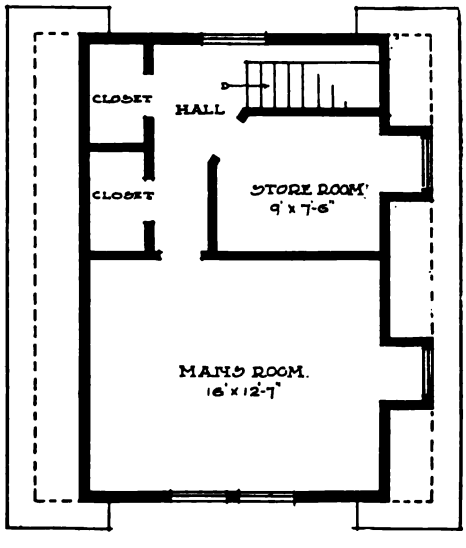
Second Floor Plan

GARAGE AT MERION, PA.

D. Knickerbacker Boyd, Architect



FIRST FLOOR.



SECOND FLOOR.

GARAGE FOR MRS. IRENE D. OVERN, OAK LANE, PA.

C. E. Schermerhorn, Architect

boiler room and coal bin reached by an outside door from the porch. This porch is also an entrance to the chauffeur's apartment on the second floor, which, as the plans show, nicely accommodates his family with sitting room, bath, kitchen and bed rooms, and which is completely separated from the floor below with its odors of gasoline.

The garage at Merion, Pa., corresponds architecturally with the house to which it belongs. The materials of the exterior are stone and brick, with a half-timbered second story. The roof is of red tile. Mr. D. Knickerbacker Boyd was the architect.

In plan, the garage consists of two stories and a basement which extends under part of the building and is used for the heating apparatus. The basement is accessible from both inside and outside, and is separated from the first story by reinforced concrete slab construction.

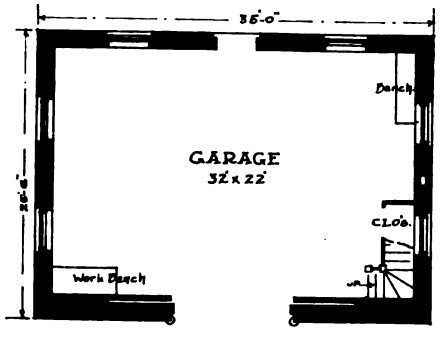
There is accommodation for four large cars on the first floor. The form of plan and the arrangement of doors make a turntable unnecessary, the cars being run into any desired position without difficulty. A feature of the plan is the washing space or covered porch on the ground floor, over which is a loft which can be used as a storage place for the winter body of one of the cars. The body may be lifted directly from the car into the loft and the trap doors closed under it.

The second floor provides accommodation for the gardener's family and the chauffeurs.

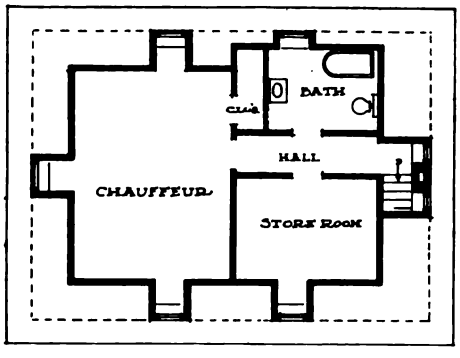
Designed to harmonize with the house to which it is an accessory, the structure on Page 33 was erected at a cost of $2,000 from plans by Mr. C. E. Schermerhorn for Mrs. Irene D. Overn. It is a one-car garage of masonry, with cement floors, and is equipped with every modern device for the automobile. A notable feature is the absence of a repair pit. It was considered an inconvenient place in which to work, and a chain and tackle take its place. By this means the forward end of the car can be raised to get at the under side when necessary.

On the second floor are sleeping accommodations for the chauffeur, and a good sized store room.

The next garage shown was designed by Mr. C. E. Schermerhorn after the Colonial idea, to harmonize with the residence of



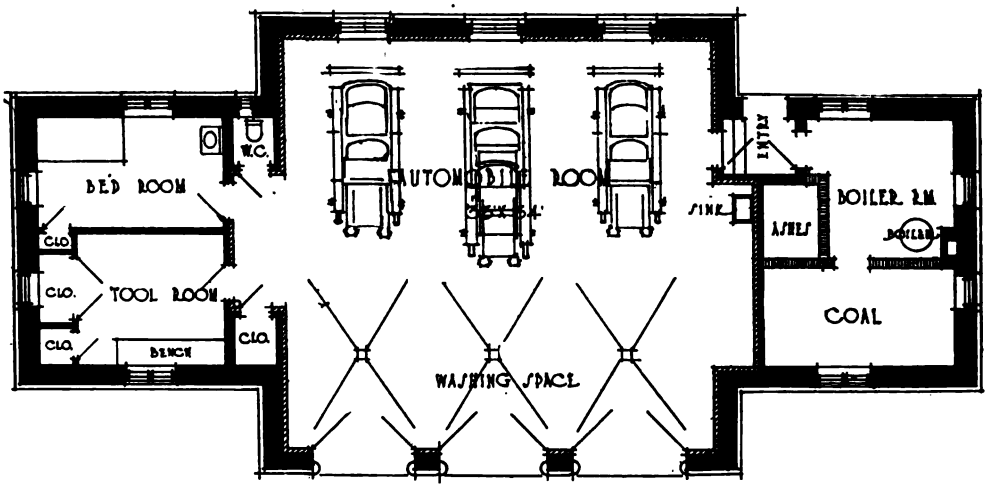
FIRST FLOOR



SECOND FLOOR

GARAGE FOR MR. CHAS. E. SCHMIDT, ELKINS PARK, PA.

C. F. Schermerhorn, Architect



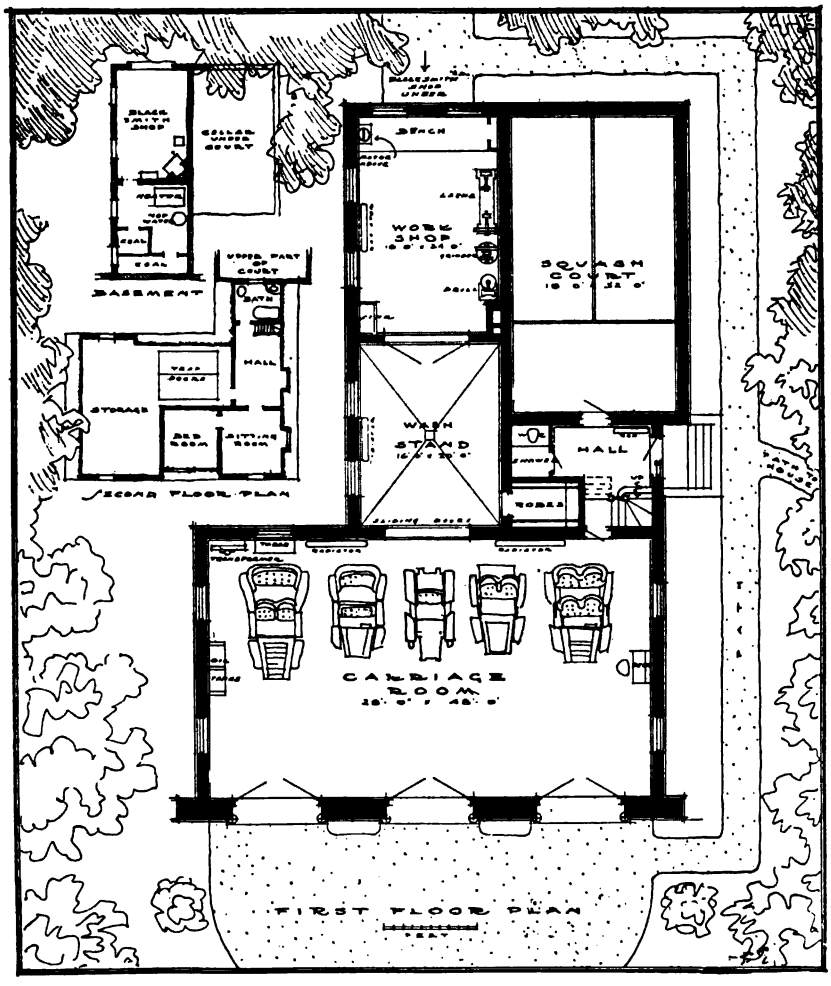
GROUND PLAN

GARAGE FOR MR. CYRUS H. K. CURTIS, WYNCOTE, PA.

Baily & Bassett, Architects

the owner, Mr. Schmidt, at Elkins Park, Pa. The building is constructed of grey stone with the Colonial pointing, the trimmings being cream white and the roof of green slate. The garage on the first floor has a cement floor and base, tiled sides, and a ceiling of yellow pine with dressed joists. There is ample room for four cars. It is completely equipped with electric lighting, overhead washing devices, under-drainage, work benches, tire cases, etc.

The second story contains a general store closet, and the chauffeur's room with adjoining bath. The cost complete of this garage was $3,500.



GARAGE FOR E. B. DANE, CHESTNUT HILLS, MASS.
Andrews, Jaques & Rantoul, Architects

GARAGE FOR E. B. DANE, CHESTNUT HILLS, MASS.

Andrews, Jaques & Rantoul, Architects

The garage built for Mr. Cyrus H. K. Curtis at Wyncote, Pa., which was designed by Baily and Bassett, is a one story fireproof building, stone exterior with Vermont red slate roof, designed solely as a receptacle for automobiles with the most modern accommodations for chauffeur's apartments, toilet room, tool room, robe closet, and hot water heating apparatus. It is also equipped with a Bowser pump and 1100 gallon tank, cabinet for lubricating oils, ceiling washer and electric pump for filling tires, with attachments on both sides of the building operated by switches.

The main room is lined from floor to ceiling with white enamelled brick and has an enamelled wash tray, fire hose, and repair pit, and large brick grease traps under each car space. An outside vestibule on the south side is arranged between the main room and the boiler room to intercept any gasoline fumes. Floor and ceiling ventilation to the outside is also provided. The doors and trim are of polished oak.

SINGLE CAR GARAGE ON CLIFTON AVENUE, NEWARK, N. J.

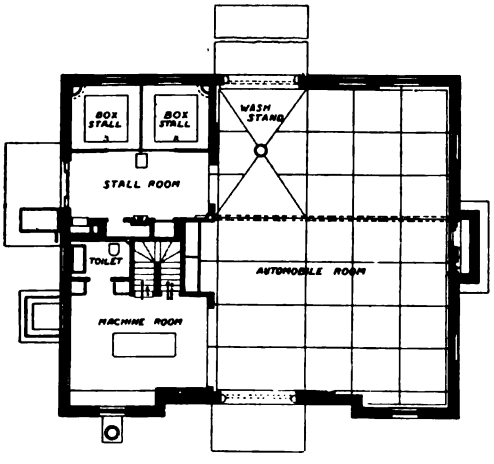
The illustrations which follow are of garages in the construction of which brick has been used as the principal structural material. Walls of brick and stone, and brick with stone trimmings are all to be found in the illustrations. The roofs and the finish are of shingle in some cases, slate in others.

The first one that we show is a large building for Mr. E. B. Dane at Chestnut Hills, Mass. It combines, together with a large room for the storage of automobiles, an adjoining room for accessory equipment, the living rooms for the men in the second story, and to one side a squash court which is approached by a separate entrance. Although this court is within the same walls, it is shut off from the rest of the structure.

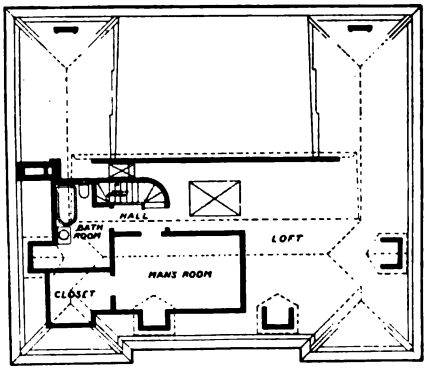
As shown on the plan, the arrangement of this building is of interest. First, there is the large garage room for the automobiles.

Jos. F. Pelletier, Architect

BRICK AND FRAME GARAGES ON CLIFTON AVENUE, NEWARK, N. J.



FIRST FLOOR PLAN



SECOND FLOOR PLAN

GARAGE AND STABLE FOR MR. F. E. ANDERSON, NASHUA, N. H.

Hill & James, Architects

Back of this and separated from it by a sliding door, is the wash stand, and beyond in line is the work shop, which contains a good equipment of machinery. Below, in a basement under the work shop, is the blacksmith shop and the heating plant for the building. The arrangement is a sensible one and convenient, as well as economical of space.

The second floor contains rooms for the men and a large storage room.

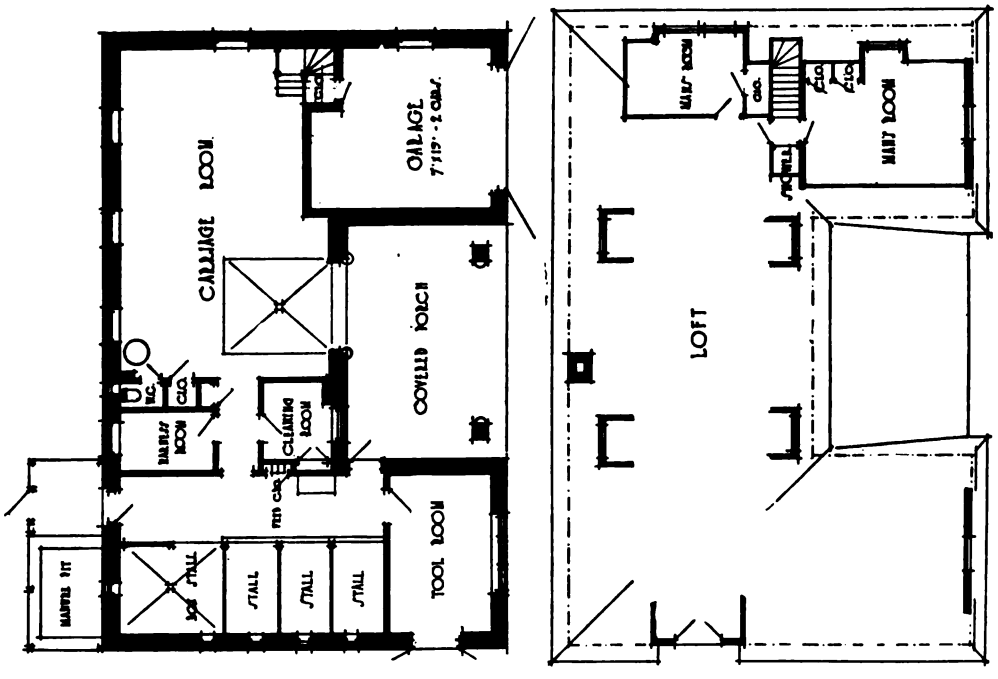
Quite a contrast in size is presented by the three garages next illustrated. One, a tiny affair of hard-burned brick with a slate roof, is a substantial and attractive little structure, with its approach and general setting close in among the houses.

The two other structures shown on Page 40 are somewhat larger and are of brick and frame construction.

A combined garage and stable designed by Hill and James of Boston for Mr. F. E. Anderson of Nashua, N. H., is our next illustration. This very substantial structure is set within an attractive formal garden and its approach and surroundings are well developed. The plan explains itself, and its accommodation is ample.

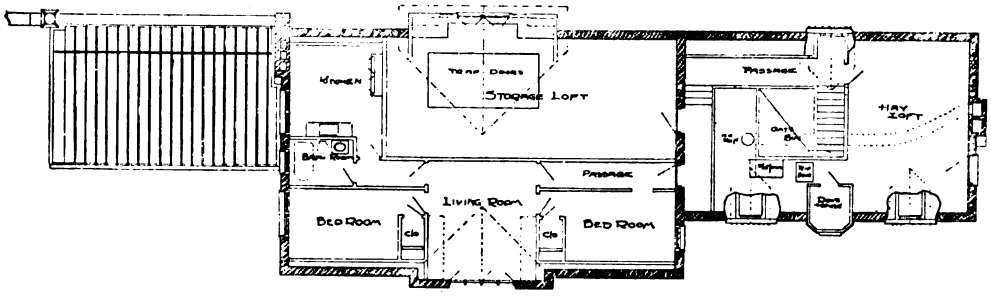
The Colonial stable on Mr. J. L. Baily's property at Ardmore is designed principally for the accommodation of horses and carriages, but space in one of the wings is made fireproof with masonry walls and reinforced concrete ceiling, and is intended for use as a garage. The doors and windows are glazed with wire glass, and the room is equipped with hydraulic gasoline pump, hot water heating and electricity, with a closet for oils, etc. The cleaning and harness rooms, toilet, livery closets, etc., as well as the tool room, are all conveniently located. On the second floor are two rooms for chauffeur and coachman, with a shower bath between. One half of the loft is used as a gymnasium and the other half for hay. The plans were drawn by Baily and Bassett.

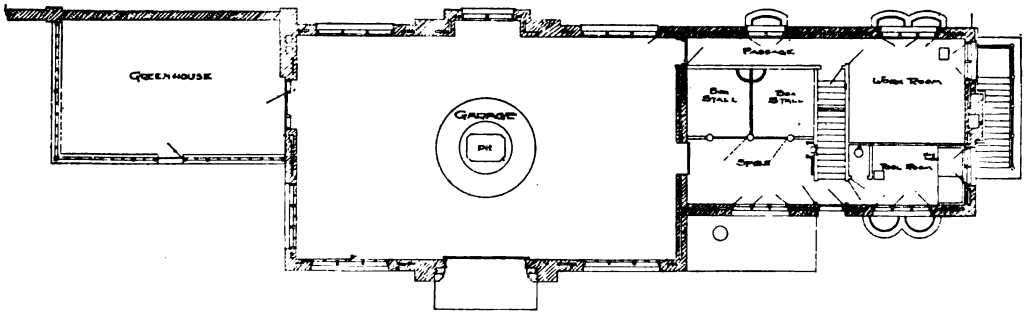
A garage building designed by Kirchhoff and Rose for Mr. Joseph Uhlein, Lake Drive, Milwaukee, is a very elaborate structure containing besides the garage, a stable, a dog house and a dove cote which occupy the right wing, and spacious living apartments on the second floor over the garage. At the left is a



GARAGE AND STABLE FOR MR. JOSHUA L. BAILY AT ARDMORE, PA.

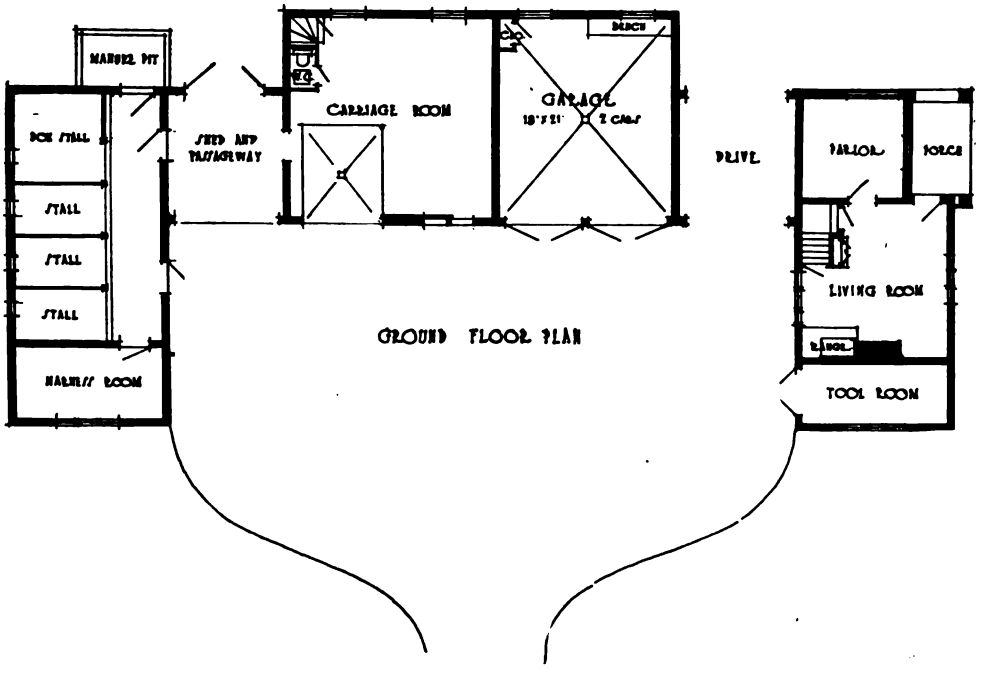
Baily & Bassett, Architects





GARAGE AND STABLE FOR JOSEF E. UHLEIN, LAKE DRIVE, MILWAUKEE, WIS.

Kirchhoff & Rose, Architects



STABLE AND GARAGE FOR THE VILLA NOVA CO. LTD.

Baily & Bassett, Architects

STABLE AND GARAGE FOR GENERAL ELBERT WHEELER, NASHUA, N. H.
Andrews, Jaques & Rantoul, Architects

greenhouse extension. The structure is built of brick, and is handsome and substantial. The stable is fitted out with two box stalls, the remaining space in the right wing being employed as a tool room and a work room, with a small section given over to the kennel. The length, exclusive of the greenhouse, is 89 feet and the width about 45 feet. On the first story the floors are of cement. The garage is equipped with a pit for cleaning purposes. The stable is also very complete. The building is lighted by gas and electricity and is heated by steam.

The low spreading building erected by the Villa Nova Company Limited, was built in connection with a large house of the English half-timbered type, and was designed for the man who has horses and automobiles, and whose coachman and chauffeur live on the property. Although the building is all under one connecting roof, the cottage is comfortably isolated by the covered passage adjoining it, and a similar passage separates the horse stable from the carriage room, the intention being to close the door at the rear on the passage in winter. Besides the cottage accommodations, a man's or chauffeur's room is provided on the

SHEET METAL GARAGE FOR DR. LIPPINCOTT, SECOND AND SUMMER AVENUES, NEWARK, N. J.

second floor, where there is also a hay loft and feed room. Baily and Bassett drew the plans.

Another building in which stable and garage have been combined is one erected for General Elbert Wheeler of Nashua, N. H., by Andrews, Jaques and Rantoul. Built of brick with a slate roof, it is a substantial structure and attractive, notwithstanding its severe lines and, as here seen, wintry setting. It is modeled in the same style—Dutch Colonial—as the residence to which it belongs and with which it makes a dignified and agreeable effect in a pleasant suburban street.

The garage for Dr. Lippincott which is illustrated on Page 47 is interesting because it represents a type not elsewhere shown. It is built of steel framework with galvanized steel side covering. The floor is of concrete and the doors, which are double folding, open outward. It has three windows 20x22 inches which are protected by ornamental iron gratings. There is a robe rack provided around the inside of the garage, as well as hooks for tires, etc., and a galvanized steel waste box. An additional feature is a ventilator which may be built on the top.

This garage is the production of the Riverside Manufacturing Company, of Newark, N. J., which builds these structures in a number of sizes ranging from 8 feet 6 inches square with 7 foot sidewalls, and with doors 6 by 7 feet, to 16 feet 6 inches wide, 20 feet 6 inches long with 8 foot sidewalls and doors 8 feet 4 inches by 13 feet 6 inches. They are also built in larger sizes still, suitable for two or three cars. These garages are of very moderate cost and possess the advantage of being absolutely fireproof, and also portable. When they are kept properly painted they are thoroughly durable and serviceable, and according to the nature of the painting they may be made to harmonize with the surroundings.

PART II

Private City Garages

THE builder of a private garage for the storage of his own automobiles in the city must be prepared to make a much larger out-lay and build a much more elaborate design than is the custom for a suburban or country building. In the first place, there are no cheap city garages. The private city garage is on the face of it, designed for a man of means. It is expensive, both in first cost and in operation and maintenance.

Some of these buildings are designed strictly for housing automobiles and nothing more. Others combine the garage and the stable, and practically all contain one or more suites of rooms, some with complete house-keeping arrangements for the chauffeur or coachman and their families.

The advent of the automobile has seen the transformation of many private stables to accommodate this vehicle. Some buildings have been completely transformed to garages and other stables have been remodeled to meet with the new requirements. In the alterations as well as in case of erecting new buildings, the requirements make fireproof structures necessary.

Besides the accommodations which must necessarily be provided in the buildings for the storage of machines, repair rooms, etc., together with living quarters for chauffeur and men, it is possible by the addition of an extra story to put in private squash courts where the owners are so inclined.

The designs shown on the following pages show considerable variety in treatment. Located on side streets and not far from Fifth Avenue, in most cases the buildings are in neighborhoods largely occupied by private houses, and their attractive façades which but little reveal the purpose of the buildings, are more in the nature of an adornment to the neighborhood than a detriment to adjoining property.

Located on East 90th Street, not far from his residence, is a private garage which was erected for Mr. Andrew Carnegie, from designs of Whitfield and King. The building is of three stories height, with 25 feet frontage and a depth of 70 feet. The façade

BUILDING AT 154 E. 70TH STREET, NEW YORK

BUILDING AT 146 E. 56TH STREET, NEW YORK

A GARAGE ERECTED FOR MR. ANDREW CARNEGIE, N. Y. CITY

Whitfield & King, Architects

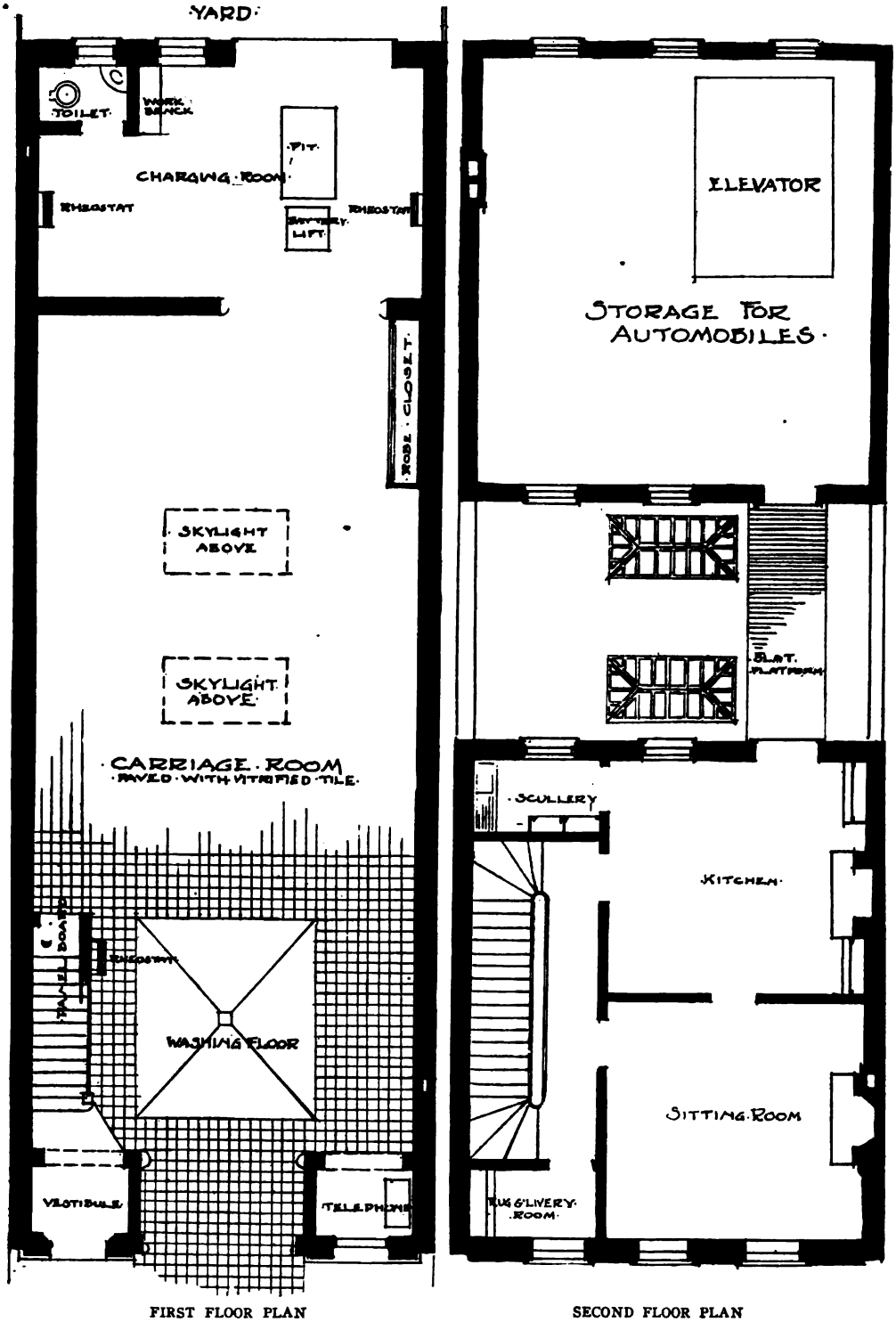
is of white Goodale marble and red Dutch brick laid English cross bond with recessed joints. As originally designed it was intended exclusively for the use of electric vehicles.

The entire first floor is used for the storage, cleaning and care of the electric automobiles. Immediately within the entrance, at the front of the room, is the washing floor which is provided with an overhead washer. Back of this is storage place for five machines, the center of the floor being lighted by two large skylights opening into a court above. At the front of the building on the right of the main entrance door, is a telephone alcove, and the desk of the chauffeur in charge. On the opposite side of the entrance is a vestibule leading to the stairs. The entire floor is paved throughout with white vitrified tiles and the walls are lined to the ceiling with semi-glazed brick. The charging room is at the rear of this floor and is shut off from the main room by a fire wall and sliding door. At the rear of this, another door opens into the yard. The charging room contains a working pit and a hydraulic lift for removing batteries from the vehicles. In this room there are two battery charging switchboards with accompanying rheostats. There is another charging switchboard located in the storage room near the washing stand so that vehicles may be charged and cleaned at the same time.

In the rear of the second floor and reached by an elevator from the charging room, there is storage room for the accommodation of vehicles not in use. At the front of the building, the second and third stories provide rooms for the men. The stairs are of iron and marble and the building is fireproof throughout.

The stable and garage for Mr. A. B. Stuyvesant is an example of alteration work. The original stable was re-designed according to the plans of Albert N. Gray into the stable and garage here shown. The brick exterior with its attractive trimmings and mansard roof of large Spanish tile, is very pleasing.

We have most to learn, however, from the plans of this building. It is 25 feet in width by 100 feet 5 inches in depth. The reconstructed building is of fireproof construction including all floors and roofs. The cellar affords a large storage space and has at the rear, a room containing a cement pit in the floor which is intended for use as an automobile repair room. There is no heating plant, steam for that purpose being taken from the street service. A large elevator with a platform 10x16 feet runs from the cellar



FIRST FLOOR PLAN

SECOND FLOOR PLAN

A GARAGE ERECTED FOR MR. ANDREW CARNEGIE, N. Y. CITY

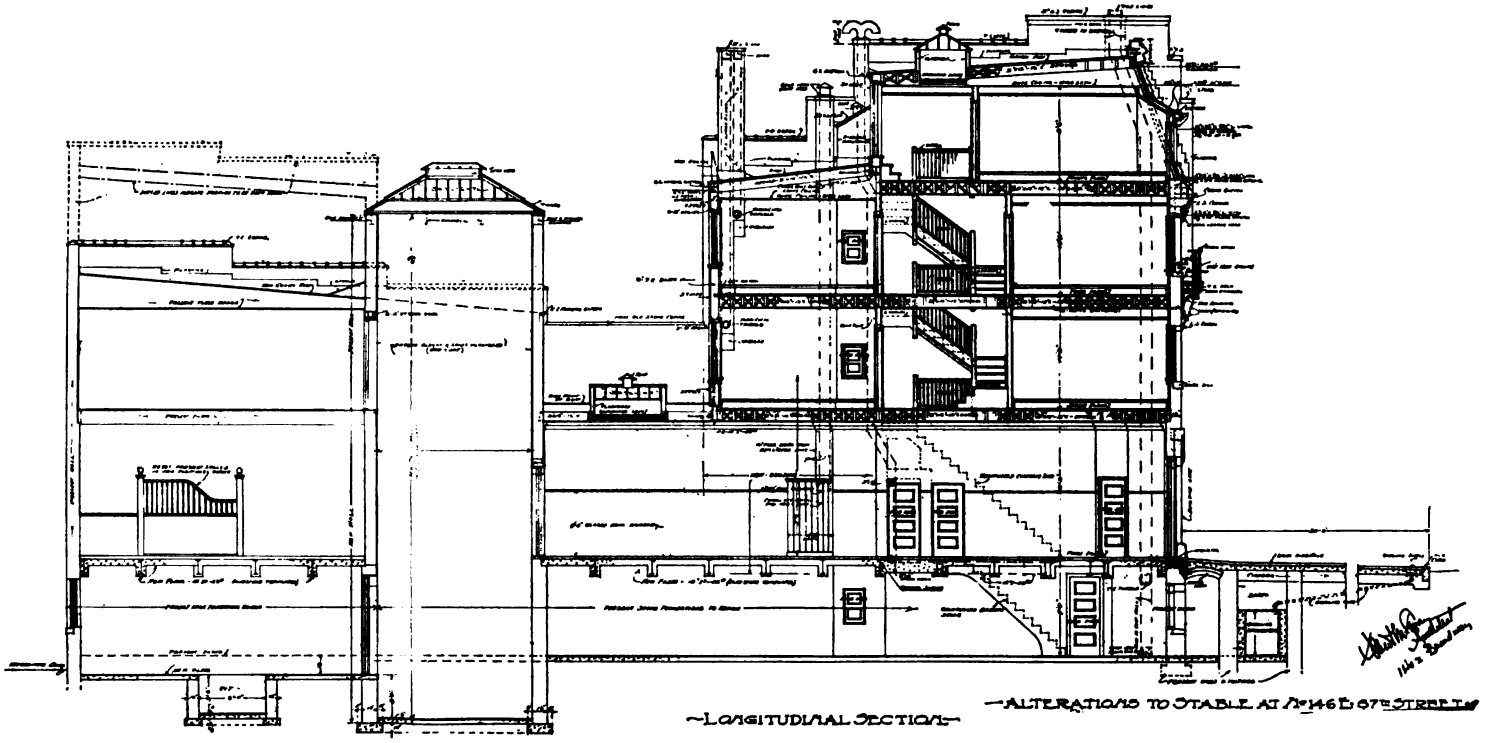
Whitfield & King, Architects

INTERIOR OF THE GARAGE ERECTED FOR MR. ANDREW CARNEGIE, N. Y. CITY

Whitfield & King, Architects

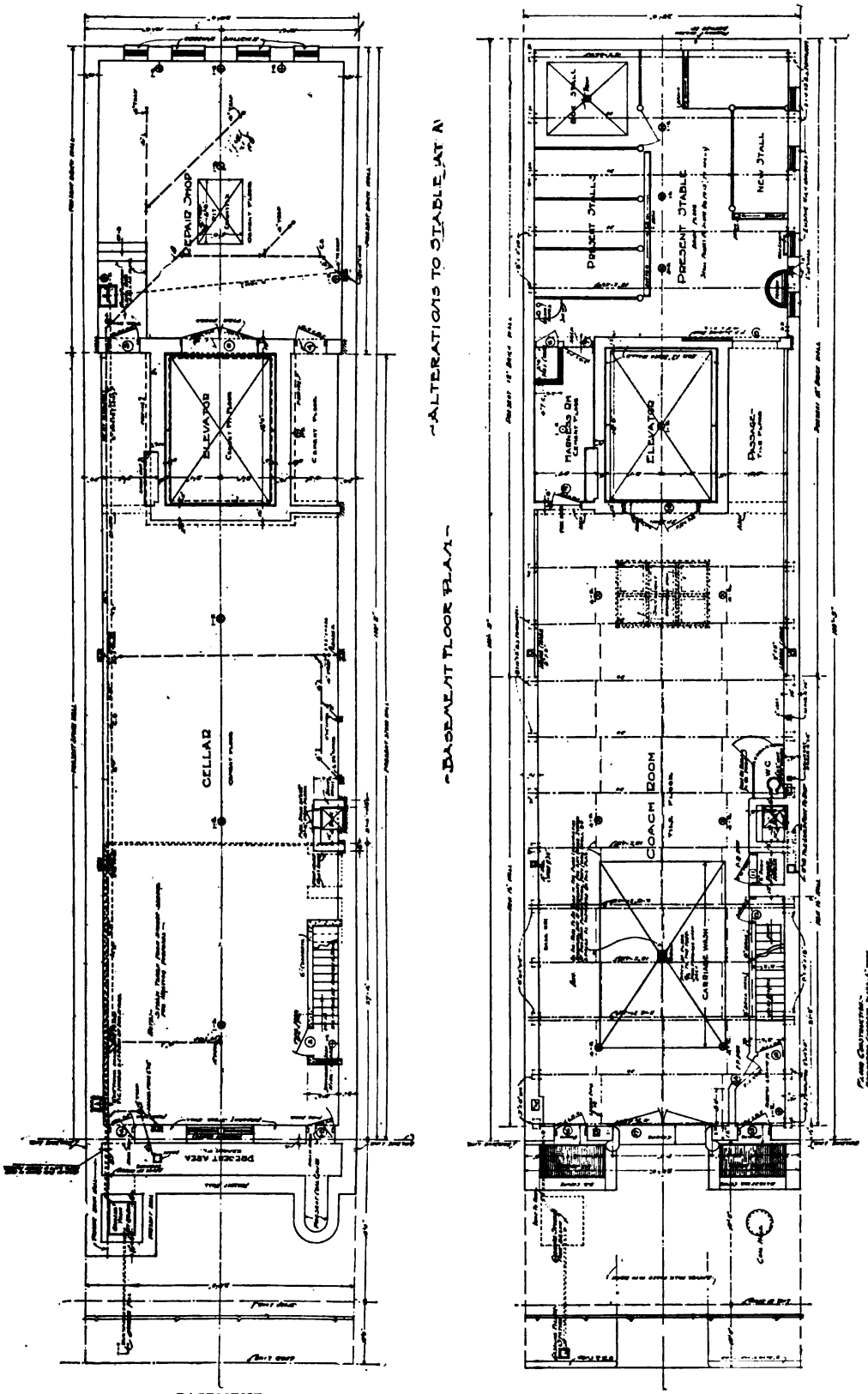
GARAGE AT 118 E. 83D STREET, NEW YORK

STABLE AND GARAGE FOR MR. A. V. STUYVESANT
AT 146 E. 57TH STREET, NEW YORK
Albert M. Gray, Architect



STABLE AND GARAGE FOR MR. A. V. STUYVESANT—LONGITUDINAL SECTION

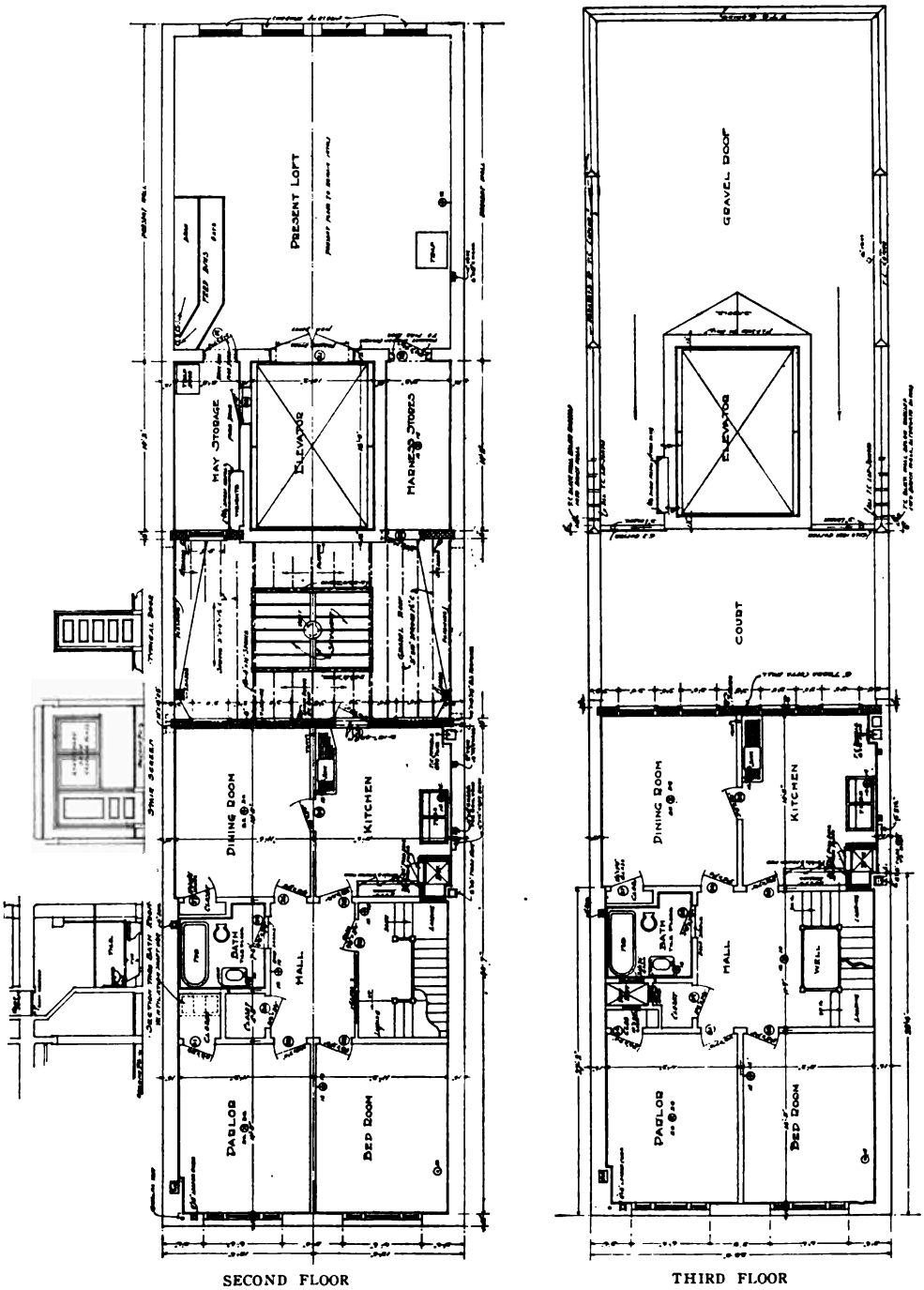
Albert M. Gray, Architect



BASEMENT FIRST FLOOR

PLANS OF BUILDING FOR MR. A. V. STUYVESANT

Albert M. Gray, Architect



SECOND FLOOR

THIRD FLOOR

PLANS OF BUILDING FOR MR. A. V. STUYVESANT

Albert M. Gray, Architect

GARAGES AT 163 AND 165 E. 70TH STREET, NEW YORK

C. P. H. Gilbert, Architect

floor level and connects with the first floor and the rear part of the second floor. Its location makes it possible to readily dispose of automobiles or other vehicles and distribute them about the building. The gasoline tank, which is filled from the street opening, is located in a brick compartment outside the area wall and entirely separated from the main building.

The first floor at street level contains the main storage room at the front with carriage washers just within the door. Just back of the middle of the room the elevator entrance is located. To

GARAGE, 168 E. 70TH STREET, NEW YORK

C. H. P. Gilbert, Architect

one side a passage leads to the stable and on the other is the harness room. The stable has four ordinary stalls and one box stall. The floor in the storage room is tiled, while the stable floor is of brick. Over the center of the room is a skylight which opens from a court above.

The second floor contains at the rear a storage loft which, as previously mentioned, is reached by the elevator. Just in front of the elevator shaft, the upper part of the building is divided by a court which extends down to the roof of the first story. The front part of the building which is thus separated consists of three more stories and is used entirely by chauffeurs, coachmen and their families. The second and third floors each contain two small suites consisting of kitchen, dining room, parlor, bedroom and bath. The third floor contains two large bedrooms. The stair hall runs up through the center and is lighted by a skylight overhead as shown on the section. This stairway is shut off from the first floor but leads into a small vestibule which is approached from the street and by a fireproof door from the storage room. A dumb-waiter running from the basement to the roof opens into the kitchens of the apartments. This building seems extremely well planned and as a combination stable and garage would seem to afford ample accommodation.

PART III

Suburban and City Public Garages

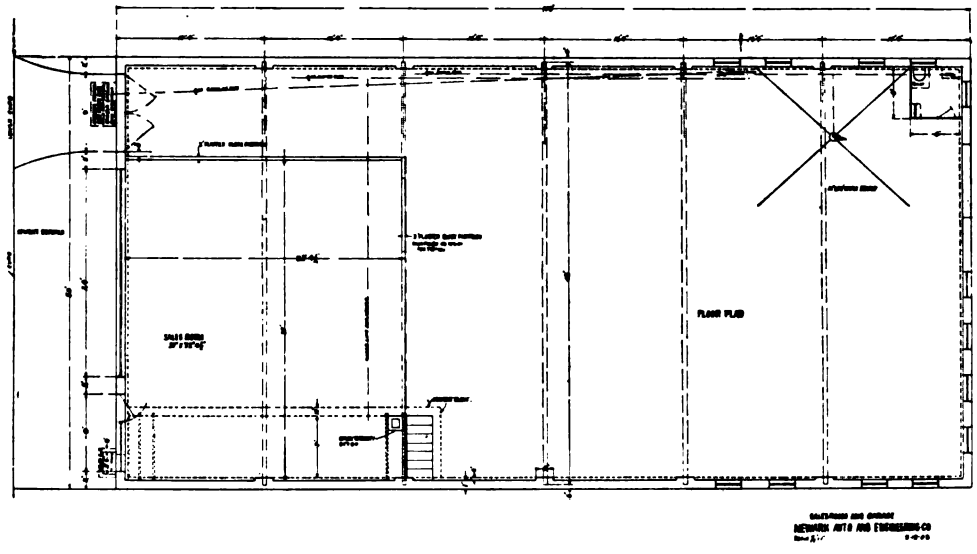
NOT every automobile owner has facility for storing his car on his own premises and the immense popularity of the automobile and its continuously spreading use both for business and for relaxation, make possible—and profitable—the business of storing the cars, and also renting them. The commercial garage is the present day livery stable. Such buildings have sprung almost mushroom-like into existence in every city and town. They are almost without exception of the fireproof type.

The building erected for the Newark Auto and Engineering Company is a neat and modest type—if anything connected with an automobile can be said to be modest—variations of which occur in suburban districts the country over. The following illustration of a garage in Milwaukee shows another development of the type. The Newark garage is a one story brick building with heavy steel I-beams in place to carry a second story. The front of the building is stucco finished and the dimensions are 50 feet by 100 feet. The show room which is about 40 feet by 40 feet has partition walls of plaster blocks and the ceiling is of metal. The Bowser system of gasoline storage was installed.

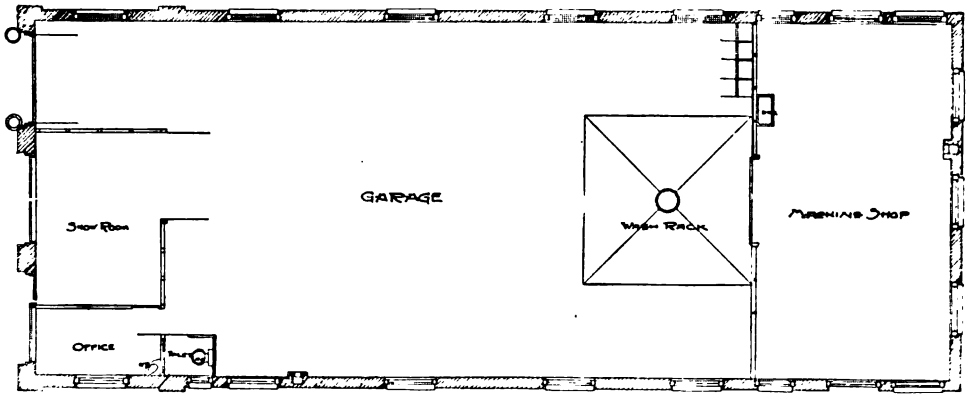
The garage owned by Mr. Eugene Wuesthoff and erected on Second Street, Milwaukee, was designed by Kirchhoff and Rose. It is a one story fireproof structure with ample accommodation for storage. There is also a good sized show room. It covers a lot 90 feet by 36 feet 8 inches, and is built of brick covered with stucco, smooth finished. The floors throughout are of cement and the building is lighted with both gas and electricity.

The show room is separated from the garage by glazed partitions, and from the office by a rail and gate. There are the necessary arrangements for cleaning the cars, and the extreme rear of the building is occupied by a large machine shop.

A somewhat larger, commercial garage is one of two story height erected on Eighth Street, Milwaukee, which was also de-

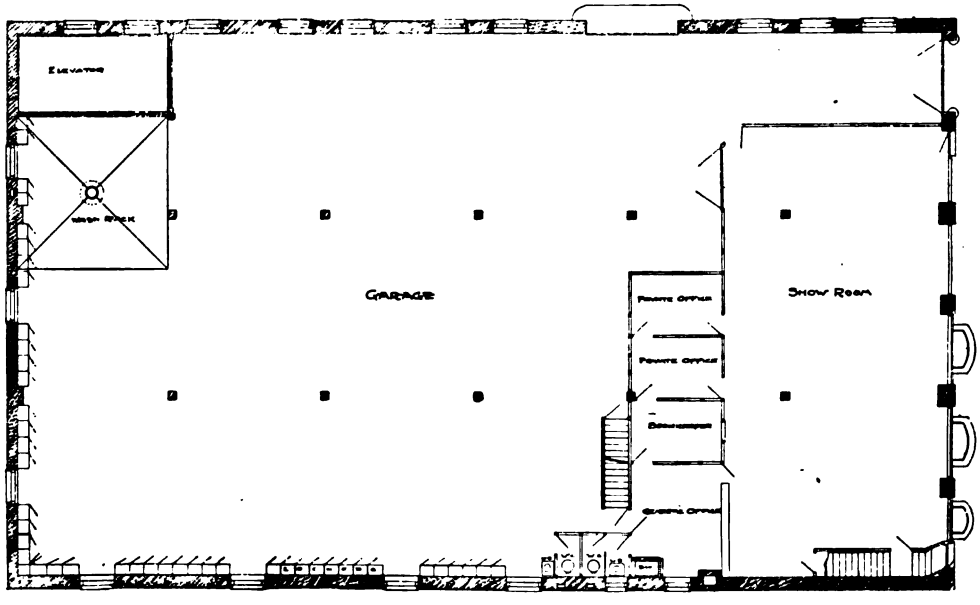


NEWARK AUTO AND ENGINEERING CO., BROAD STREET, NEWARK, N. J.



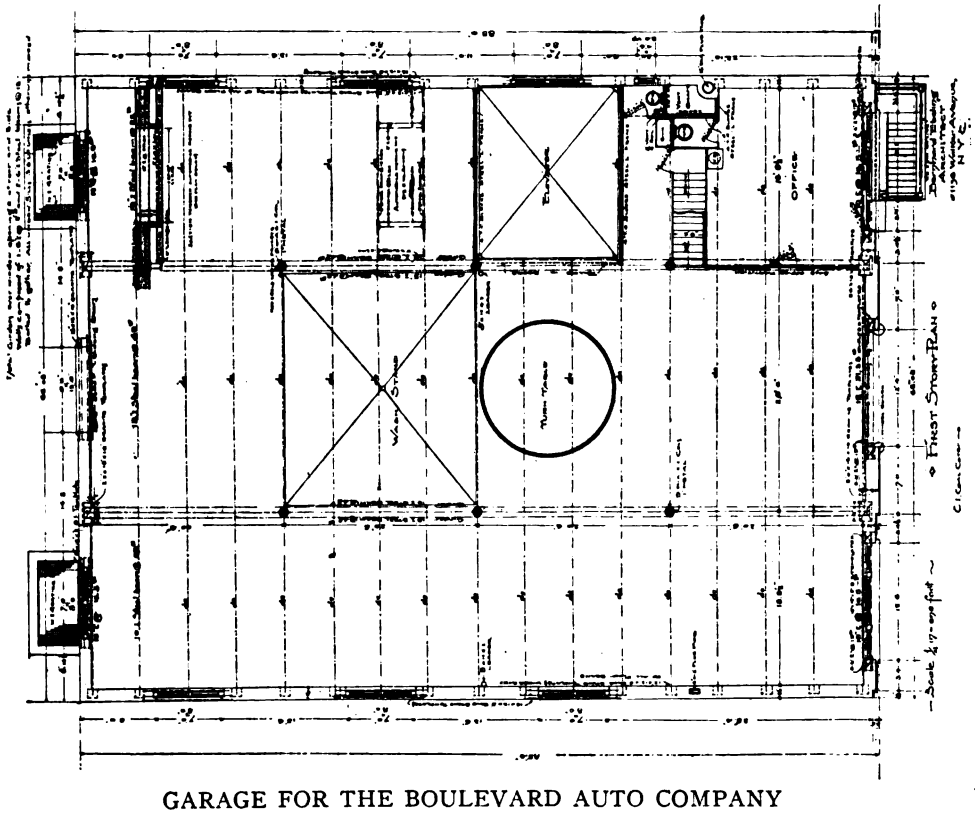
GARAGE ON SECOND STREET, NEAR STATE STREET, MILWAUKEE, WIS.

Kirchhoff & Rose, Architects



GARAGE ON EIGHTH STREET, WILWAUKEE, WIS.

Kirchhoff & Rose, Architects



GARAGE FOR THE BOULEVARD AUTO COMPANY

Bernard Ebeling, Architect

THREE CONCRETE BLOCK GARAGES IN EAST ORANGE AND BRICK CHURCH, N. J.

A FRAME GARAGE AT LARCHMONT, N. Y.
Chas. A. Lupprian, Architect

signed by Kirchhoff and Rose for Mr. Eugene Wuesthoff. The building is 75 feet wide by 125 feet deep and is constructed of brick, with cement floors throughout with the exception of the offices and show room, where the floors are of maple. The toilet room floor is of wood laid on strips embedded in the concrete floor underneath. The large show room is enclosed by a glazed partition. Two sides of the storage room are given up to lockers. Provision is made for both gas and electric lighting. A large elevator gives access to the storage on the second floor. There are the usual arrangements for washing and cleaning the cars.

In the Bronx, which is perilously near the region of mammoth commercial garages, the Boulevard Auto Company has erected a two story and basement garage which is more suburban than urban in its characteristics. The exterior is of brick with light trimmings. The building has a frontage on Southern Boulevard of 66 feet, and a depth of 85 feet. The depth of the building is traversed by two lines of girders which are carried on cast iron columns spaced 20 feet 6 inches on centers. The girders are 18 feet 8 inches from each side wall, with 26 feet center space. The fireproofing is of concrete.

One large elevator running from the cellar to the top floor, serves the building. A turntable on the first floor is a convenience.

CONCRETE GARAGE FOR PALMER & SINGER MFG. CO., BROADWAY, NEAR 50TH STREET, NEW YORK

Marvin & Davis, Architects

CONCRETE GARAGE FOR PALMER & SINGER MFG. CO. THE ELEVATORS WITH TURNTABLE BEFORE THEM AND A PORTION OF STORAGE FLOOR

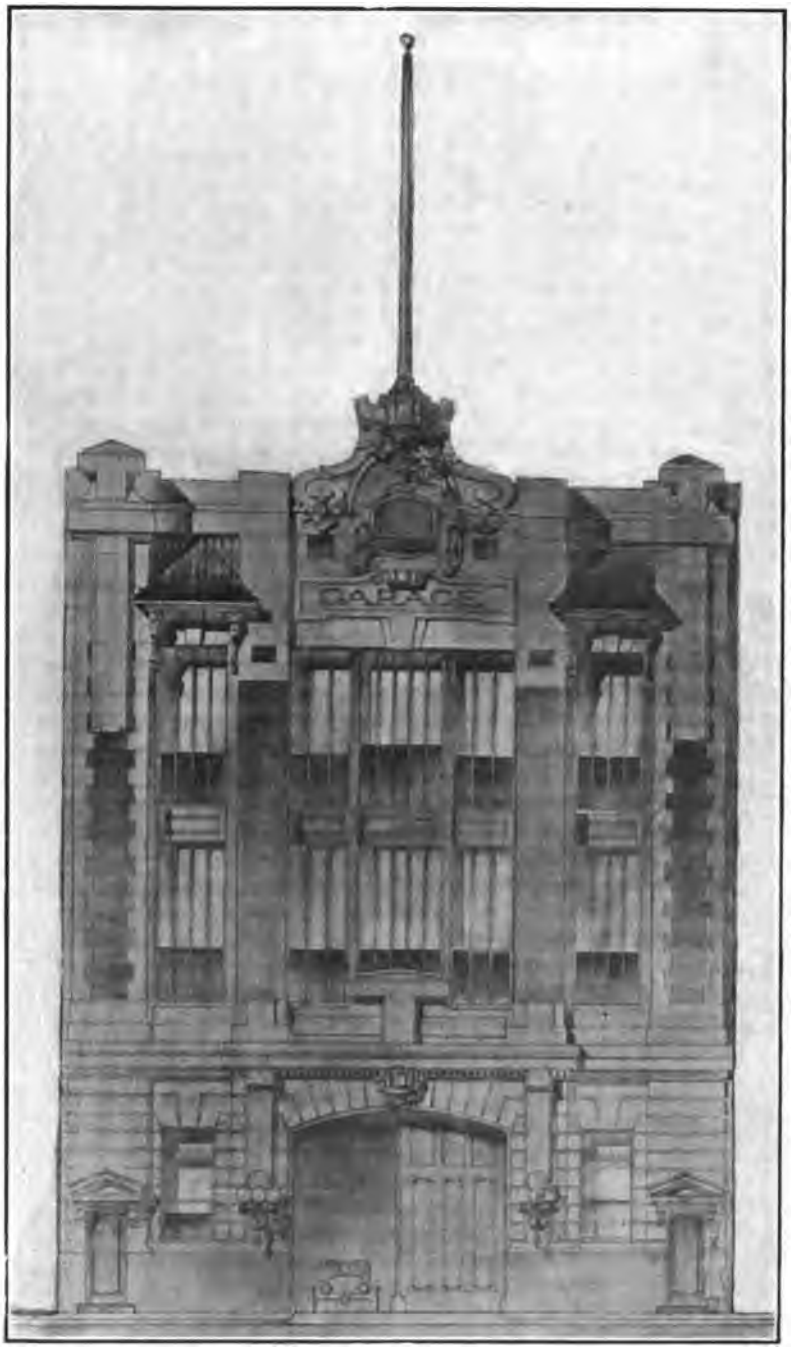
Marvin & Davis, Architects

The Palmer and Singer Manufacturing Co., garage occupies a 50 foot lot which extends from Broadway 150 feet through to Seventh Avenue, between 49th and 50th Streets. It is a five story and basement, reinforced concrete building, the system of the Trussed Concrete Steel Company having been used in the reinforcement. Throughout the interior, wooden trim is almost entirely absent, and the floors are finished with cement surface. The elevators are enclosed by concrete partition walls, and each floor is practically isolated, these precautions adding greatly to the fireproof qualities of the structure.

The Broadway end of the first floor is occupied by a show room which extends the width of the building, its dimensions being 36x48 feet. The Seventh Avenue end of the floor is the entrance way for the garage, which leaves about one-third of the entire floor space available for storage purposes.

A mezzanine above the first floor provides desk room in a gallery over the main show room, the remainder of the mezzanine being utilized as a locker room for owners of machines; 450 lockers are provided, two being allowed for each machine stored.

An area of 22x24 feet on each floor is occupied by the elevators, and the carriage washer occupies a slightly smaller space. A turntable on each floor is 14 feet in diameter, and this also cuts into the storage room. The elevator cars are 10x20 feet and will carry 12,000 pounds, a size and capacity capable of handling the largest touring car. The turntables carry 5 tons.



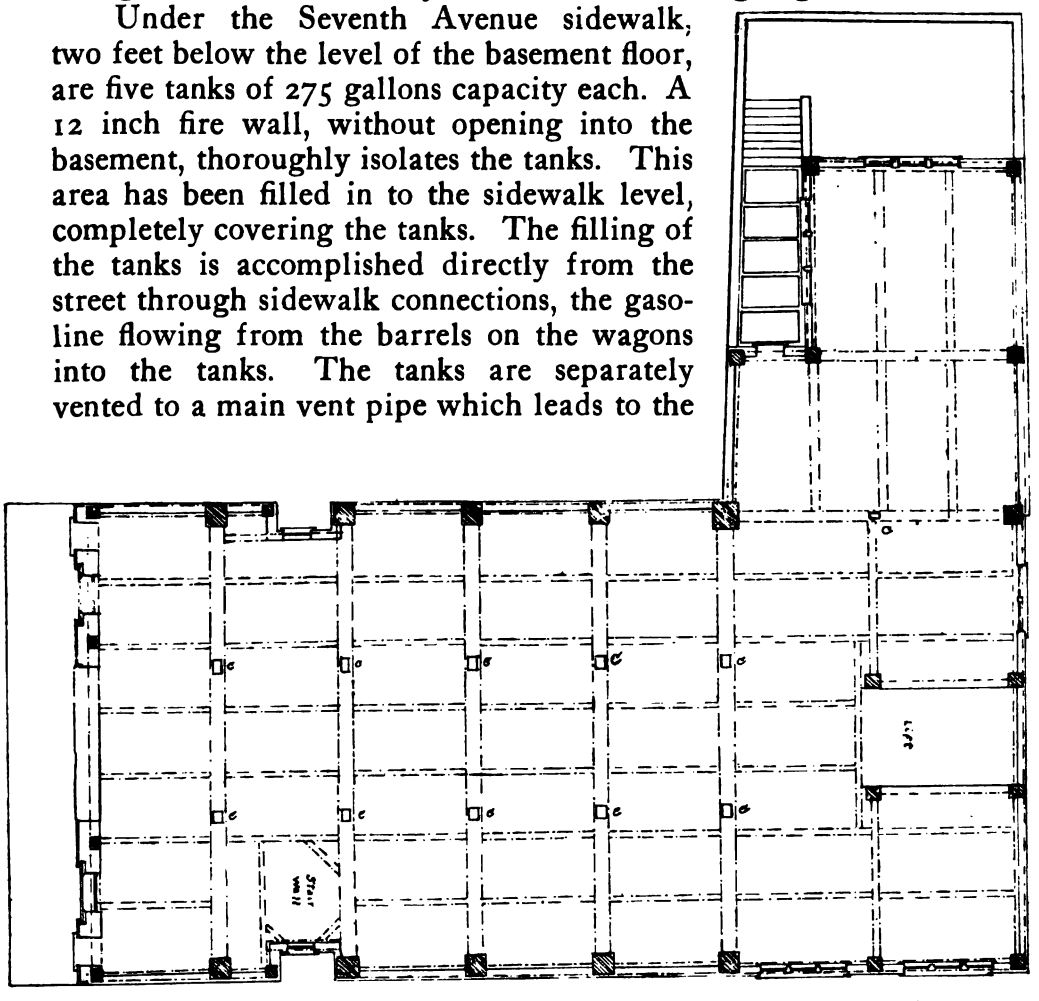
GARAGE BUILDING, WEST 93D STREET, NEW YORK CITY

Snelling & Potter, Architects

In the basement, a vault at each end is available for the storage of automobiles, and there are several repair pits as well. The boiler room, which is at the Seventh Avenue end, is completely isolated from the remainder of the basement and is entered from the sidewalk only. The elevator machine room is also isolated, but is entered from the Broadway side by a self-closing fireproof door.

The requirements of the Bureau of Combustibles, and the desire of getting as low a rate of insurance as possible, make necessary an efficient system of handling and storing gasoline and lubricating oils. The Bowser system is in use in this garage.

Under the Seventh Avenue sidewalk, two feet below the level of the basement floor, are five tanks of 275 gallons capacity each. A 12 inch fire wall, without opening into the basement, thoroughly isolates the tanks. This area has been filled in to the sidewalk level, completely covering the tanks. The filling of the tanks is accomplished directly from the street through sidewalk connections, the gasoline flowing from the barrels on the wagons into the tanks. The tanks are separately vented to a main vent pipe which leads to the



PLAN OF GROUND FLOOR GARAGE, W. 93D STREET, NEW YORK
Snelling & Potter, Architects

roof. The delivery of the gasoline is accomplished by means of three pumps which are placed in a fireproof pump room which is vented to the roof by an 8x8 inch vent. The pumps measure the gasoline as delivered, and record by the pint, quart, half gallon and gallon. From the pumps the gasoline is delivered into a portable filling tank which contains 50 gallons. This can be wheeled directly to a machine at any point and the supply pumped in and measured.

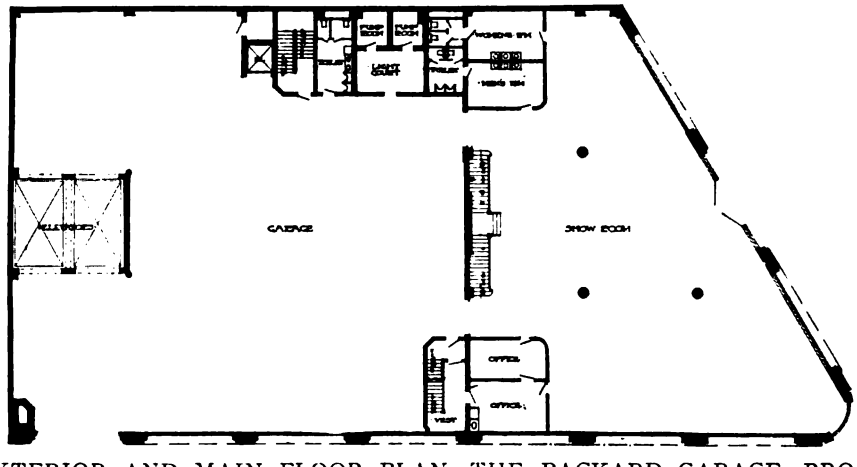
The lubricating oil is handled in a similar manner. Four tanks of 250 gallon capacity, for different kinds of lubricating oil, are located in the basement. They are provided with recording apparatus to show the standing supply and have a special barrel track for convenience in filling the tanks directly from the barrel. A lubricating oil pump from each tank is located in a screen inclosure on the first floor. From this room a portable lubricating oil tank is supplied.

The business offices of the company occupy the front of the second story, while on the Seventh Avenue side there are the chauffeurs' rooms, locker rooms, toilet, showers, etc. The third and fourth floors are entirely given up to storage space.

The total floor area of a single floor is about 7,000 square feet. Deducting from this the elevator space and the space occupied by the washer and turntables, approximately 5,500 square feet of floor area are available for the storage of machines. Forty large cars can be stored on a floor without crowding. The live load allowed is 150 pounds per square foot, which is adequate to carry the heaviest machine.

The top floor is used principally for the repair shops. The shop is located at the Broadway end, and is 48 feet square, with a storeroom for machine parts at one side. At the Seventh Avenue end there are four repair pits. The estimated storage capacity of the building is about 175 cars.

The garage on West 93d Street, New York City, designed by Snelling and Potter, contains a good repair department and machine shop, as well as storage room for automobiles. There are three floors and basement, the basement having a height of 9 feet, the first floor 18 feet, and the two upper stories about 15 feet each. The first floor is intended for the use of machines which are in daily use, the second floor for general storage, while the repair department is on the third floor.



EXTERIOR AND MAIN FLOOR PLAN—THE PACKARD GARAGE, BROADWAY AND 61ST STREET, NEW YORK

Albert Kahn, Architect

Study of the plan will show that the building is L shaped. The lot has a width of 50 feet in front, while the L is 32 feet 6 inches wide. The depth is 100 feet. The exterior is simple in design, with solid piers running up the front with large windows between. The cornice is ornamented with a central terra cotta relief representing a speeding automobile. The central doorway, which forms the entrance to the building, is about 16 feet wide and about 16 feet high.

On the first floor, on one side of the entrance, is the office, a room about 14 feet square, back of which is a spiral staircase leading to the upper floors. Opposite the office is a room of similar dimensions which is used as a club room by the patrons of the garage. The elevator, which is 10 feet by 16 feet 8 inches, is at the rear of the building, and at one side of this is a washing stand about 20 feet square. The L on the second floor is fitted up as a locker room for patrons, and contains a toilet room and wash room as well.

THE SALESROOM—THE PACKARD GARAGE
Albert Kahn, Architect

ACTON GARAGE, 137 WEST 89TH STREET, NEW YORK

L. A. Goldstone, Architect

The repair department on the third floor is lighted by a central skylight. There is a complete machine shop and all appliances necessary for the repairing of an automobile, including an electrically lighted pit for working below the machines.

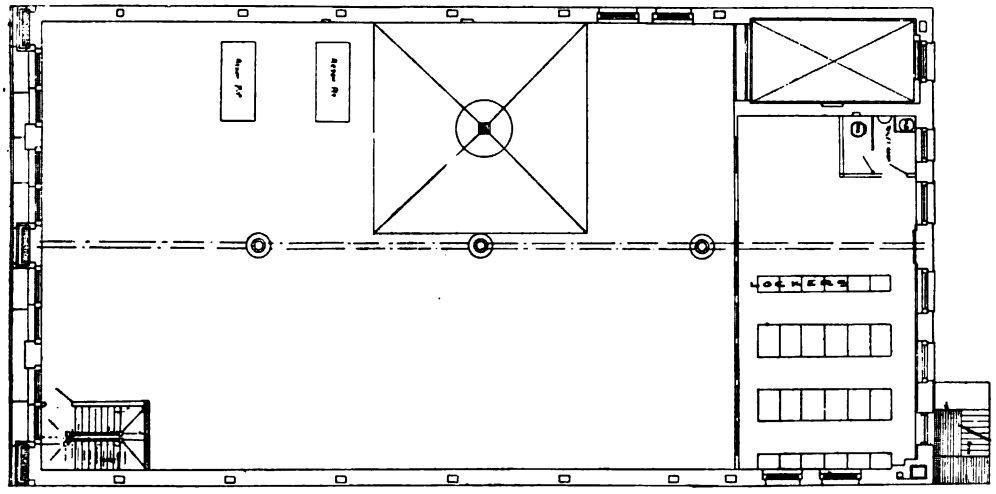
Although there are only three stories, the total height of the building is nearly 70 feet owing to the extra height of each story. There are toilets and wash rooms on every floor for the employees. The heating is by steam.

The frame or skeleton of the building is of reinforced concrete which works in the same manner as a steel construction. The piers in the side walls are 26 inches square, while the piers across the front, in the wing and about the elevator shaft, are 18 inches square. There are a few smaller columns 16 inches square and one that is 34 inches square. This last is at the angle of junction between the wing and the main structure, and is unusually heavy because of the extra number of girders attached to it. These are the dimensions at first floor level. The sizes diminish slightly as they reach the upper floors. The main cross girders are 2 feet by 3 feet in size, and were built up with the columns so that the whole is monololithic. Smaller concrete beams, 12 inches by 18 inches, connect the main beams and support the floor, which consists of 5 inches of concrete reinforced with bars. The proportions of the girders vary with the width of the span. The greatest span is across the front section of the building, where the width is 50 feet. This space the concrete beams cross without any central support on the upper floors. In the basement, however, there are pillars indicated in the plan at C C, etc., which carry the floor of the first story. The piers and girders average about 13 feet 6 inches apart on centers, while the smaller transverse beams which support the floor are about 7 feet on centers. On the top floor a reinforced girder runs completely across the front, giving support to the terra cotta ornament of the cornice, and the flag pole.

The reinforcement is accomplished by using a rather light bar or bond perforated at intervals, and also a plain bar about ¼ inch square. There are about sixteen of these bars in one of the 18 inch piers.

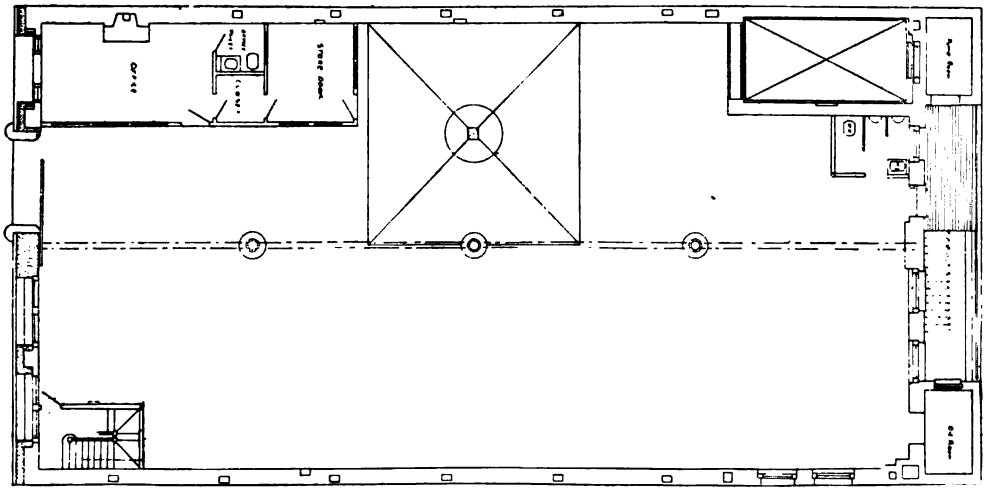
The well of the stairs is an interesting piece of work, which is clearly shown on the plan. Short concrete beams across the corners form the supporters at each floor for the spiral iron staircase, which runs from basement to the roof.

The building was left plain on the interior, with the girders



of the ceilings exposed. The floors are cemented over the concrete, giving a smooth and easily cleaned surface.

The Packard Garage at 61st Street and Broadway, New York City, was built from designs by Albert Kahn, and the Kahn system of concrete construction was employed in its erection. It is a four story structure of terra cotta, mat finish. The series of bays extending almost to the top of the building is the most striking feature of the exterior. These bays contain iron framed windows and afford excellent light to the interior. A number of large chandeliers furnish light at night.



ACTON GARAGE—FIRST AND SECOND FLOOR PLANS
L. A. Goldstone, Architect

The building is actually three storied, the first two stories having been made into one, making a lofty interior. There is, however, a mezzanine floor at the rear of the store floor.

The Acton Garage on 89th Street, New York City, was designed by L. A. Goldstone. Of five story height, the building occupies a lot 50 feet by 100 feet 8 inches. The foundations were carried down to solid rock, and the gasoline pits, oil room, boiler room and motor room are carried down to a depth of 16 feet below the curb.

The exterior is very plain, possessing no especial feature. The building is of absolutely fireproof construction, and was designed to meet every requirement of the New York Board of Fire Underwriters, the Insurance Exchange, and the Bureau of Buildings. The installation of vent shafts from the floor level of each story extending to the roof and isolated from the remainder of the building, and the elimination of all non-fireproof construction of any description, were in accordance with the regulations of the above mentioned bodies.

The elevator which serves the building is of 6 ton carrying capacity, and in size is 10 feet by 20 feet. As is shown on the plan, three columns on each floor suffice to carry the floor systems, and these do not in any way interfere with the movements of the cars.

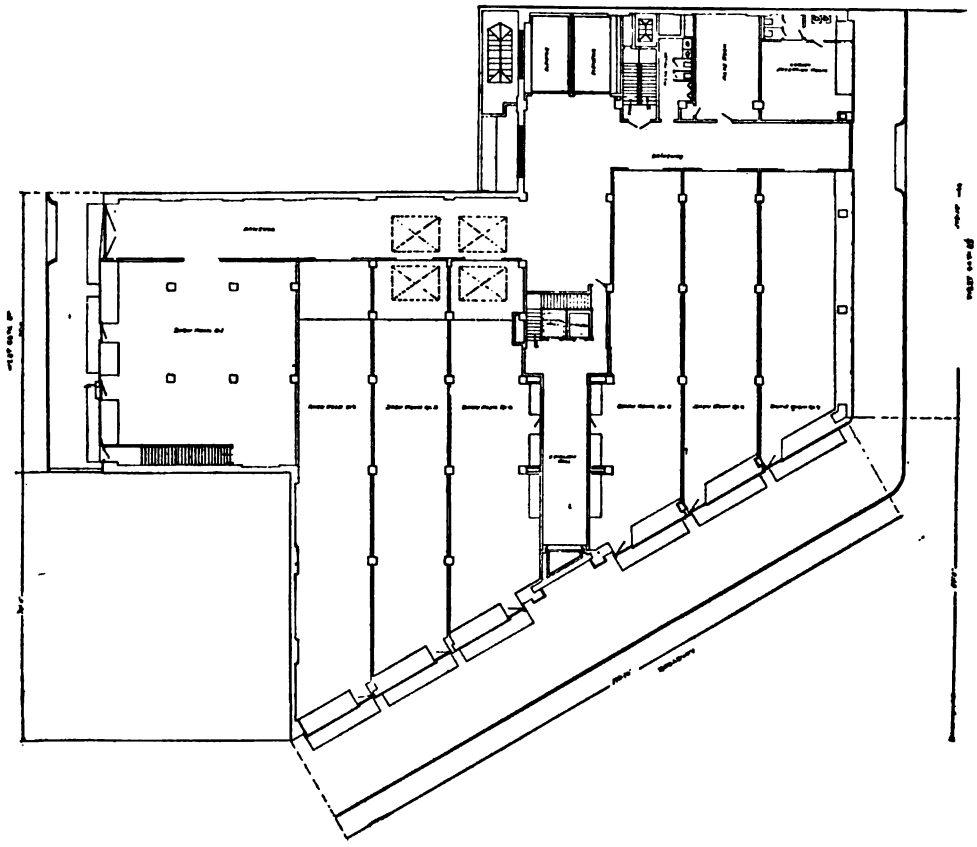
The Goelet Garage, built from designs by F. M. Andrews & Co. is one of the largest commercial garages in New York City. It occupies an oddly shaped lot, facing approximately 174 feet on Broadway, 110 feet on 64th Street and 75 feet on 65th Street. A large light court gives light and ventilation from the back.

The building is of reinforced concrete construction and is, of course, fireproof. The exterior walls are of light colored brick and terra cotta, with wrought iron trimmings.

As to interior arrangement, the first floor is divided into sales rooms, and the upper floors are designed for storage purposes. Four elevators serve the building; two, which are approached from the main entrance on Broadway, are of the fast, passenger type, and two are freight elevators. These last are approached by driveways from the 65th and 64th Street sides, and are 10 feet by 25 feet in size and of 20,000 pound carrying capacity. Each floor has 19,000 square feet of space, giving a total for the building of nearly four acres. There are commodious toilets and lavatories

GOELET GARAGE, 64TH STREET AND BROADWAY, NEW YORK

F. M. Andrews & Co., Architects
Maynicke & Franke, Consulting Architects



GOELET GARAGE, 64TH STREET AND BROADWAY, NEW YORK
F. M. Andrews & Co., Architects
Maynicke & Franke, Consulting Architects

on each floor, and on each storage floor are two wash racks and three pits. The floors are dampproof and of unusual thickness, thus providing against noise and vibration.

On the ground floor the street facing sides form an almost continuous plate glass show window, which makes the salesrooms within very light and attractive. This building, unlike most of those illustrated in this book, was built as an investment. The majority of the others were designed especially for the firms which occupy them.

The Fuller Service Depot, Boston, Mass., is a building 352 feet by 70 feet, and was designed by Albert Kahn. Fronting on three city streets and surrounded by grounds 352 feet by 190 feet, the building has an unusually attractive setting. The fourth

FULLER SERVICE DEPOT—A GARAGE FOR PACKARD MOTOR CARS, BOSTON, MASS.

Albert Kahn, Architect

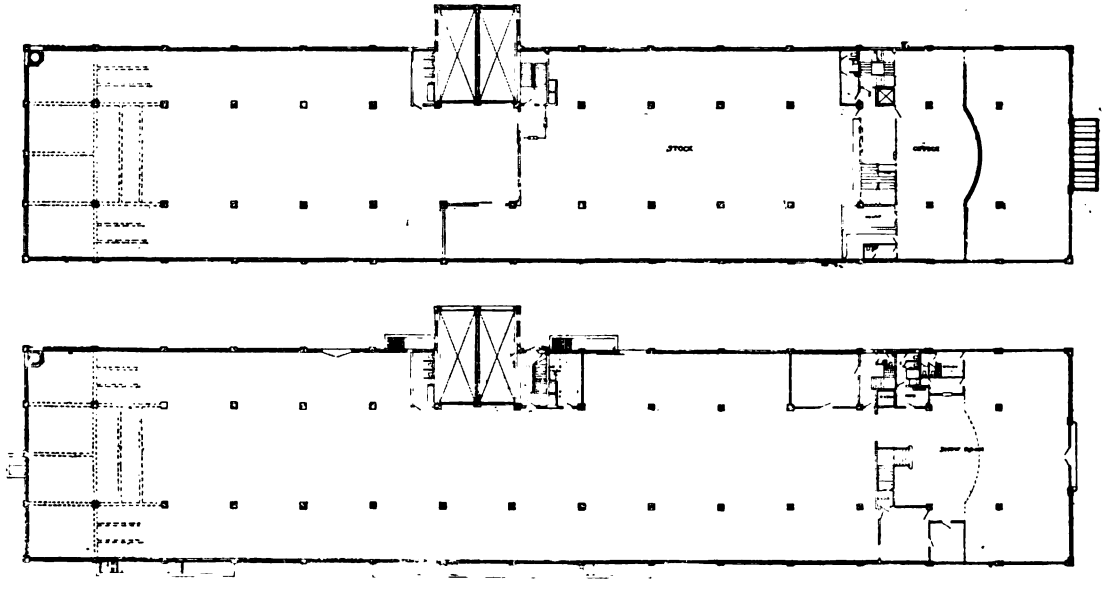
side overlooks property owned by Mr. Fuller, which assures perfect light from all sides.

The building consists of four floors and basement, constructed entirely of reinforced concrete, and absolutely fireproof. An automatic sprinkler system is provided as an additional precaution.

The entrance and exit for cars, and the outside entrances are from a driveway through the grounds, consequently a front car entrance was unnecessary.

In the basement is a large room, more than half the area of which is devoted to the storage of cars and several wash racks. In the basement also is a large oil room with suitable reservoirs for each different class of lubricant. Just outside of the oil room, and underground, is a gasoline tank with a capacity of 1,000 gallons. This tank and each of the reservoirs are connected with pumps leading to the oil room and to corresponding oil supply rooms on every floor. Lubricants of all kinds and gasoline are thus immediately available in all parts of the building. Lockers for 200 mechanics, with lavatory and other facilities on a corresponding scale are situated in the basement also. A most unusual feature for this class of buildings is a restaurant for the use of employees, with a completely equipped kitchen. There are two dining rooms—one for the mechanical force, and the other for the office force. The basement has a direct outside entrance to the driveway which is more convenient than the elevators for getting cars in and out.

The entrance to the building is from Commonwealth Avenue and leads directly into the sales room, which occupies the width of the building and has a depth of 70 feet. In the right rear corner of this room are the telephone switchboards, a lavatory, and the passenger elevator. In the opposite corner is the general manager's office, and back of this are the offices of the technical and specification departments. The finish of these offices is entirely of quarter sawed, light fumed oak, and all glass about the offices is leaded. The sales room is 28 feet in height, but part of this height is occupied by a mezzanine floor where the general offices, accounting departments, etc., are located. The mezzanine is reached by a stairway which rises from the central rear portion of the sales room and turns to the left. The rear of the main floor is occupied by one large room, 70 feet by 280 feet. The columns which support the upper floors are placed 15 feet from the side walls, leaving an unobstructed space down the center 40 feet wide. This is ample



FIRST AND SECOND FLOOR PLANS

FULLER SERVICE DEPOT—INTERIOR AND PLANS

Albert Kahn, Architect

room in which to manipulate the largest cars or trucks. Two large electrical freight elevators, each one capable of holding two large cars and lifting a load of 8,000 pounds, are placed at one side of this room and have both inside and outside entrances. Back of the elevators is the exit for outgoing cars, and back of the exit, along one side of the building, is a space provided where owners and chauffeurs can work on their own cars, no outsiders being permitted in the repair shop on the fourth floor.

On the second floor at the head of the stairway is the repair sundry department. Back of the sales counter is the stock room, where are to be seen tier after tier of bins. The stock room is connected with each floor of the building by two electrically operated dumb-waiters, and by telephones and speaking tubes. At the rear of the stock room is the shipping room, and also the receiving department, and back of the stock room, the entire remainder of the second floor is given over to the storage of automobile bodies, which are placed upon suitable wooden skids and supported upon iron framework.

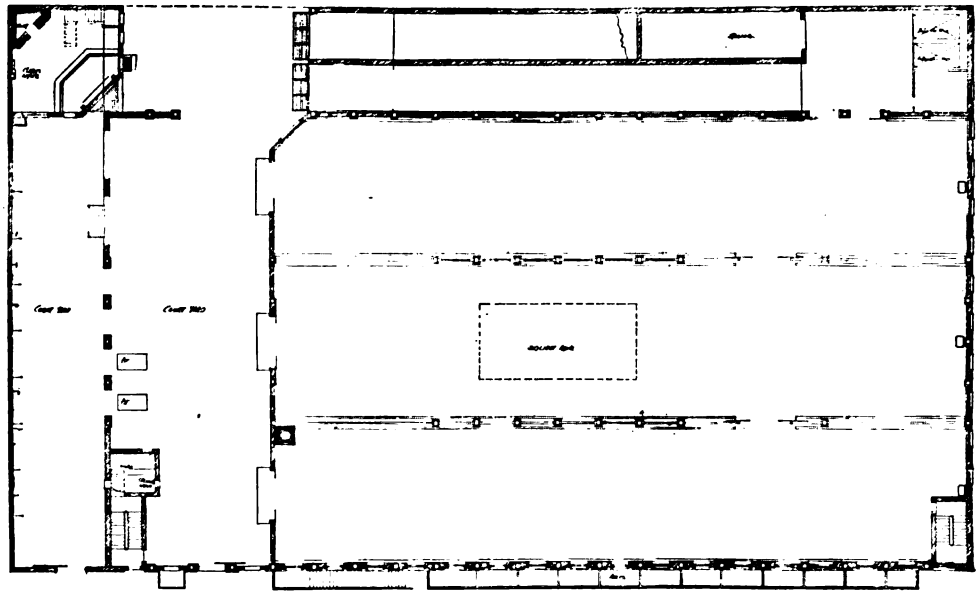
On the third floor are the trim shop, where tops, seat covers, etc., may be repaired or manufactured; a large open space devoted to receiving and inspecting new cars; and the paint department, which is shut off from the remainder of the floor by fire walls.

The fourth floor is one large open room devoted to the purpose of a general repair shop. The roof is trussed and the whole floor left free from any obstruction. There is light from four sides, and from two large skylights as well. The entire room is surrounded by a work bench. Partitioned off from one side, just back of the elevators, is a blacksmith shop, made fireproof and apart from the rest of the building. In this are various types of forges, together with facilities for hardening and tempering.

On Fifty-seventh Street, between Eleventh and Twelfth Avenues, New York City, is located what is at present the largest garage in America, the New York Taxi-cab Company's garage, designed by F. M. Andrews & Co.

This garage is a four story and basement, red brick structure, with a frontage of two hundred and twenty-five feet, and a depth of one hundred and forty-five feet.

Externally, the building possesses no features of interest; but its interior is replete with suggestions of great merit and several devices of a decidedly unique character. Among these unique fea-



GARAGE FOR THE NEW YORK TAXI-CAB COMPANY, WEST 57TH STREET, NEW YORK

F. M. Andrews & Co., Architects

ENTRANCE TO INCLINES LEADING TO BASEMENT AND SECOND FLOOR OF THE NEW YORK TAXI-CAB GARAGE

tures may be mentioned, inclined runways by means of which cars may propel themselves to the topmost story of the building; washing platforms of great practicability; fireproof dividing bays; and various devices designed to facilitate the handling of cars.

The general arrangement of the building, which will be better understood by a study of the accompanying plans, is as follows: The first, or street floor is given over to the extensive general offices of the company and a large exit and entrance driveway, and a storage depot having a capacity of 175 cars.

From the first floor, cars ascend, by means of the inclined runways, to the second and third floors, which are devoted entirely to storage purposes. Each of these floors is sub-divided by a series of three partitions into four fireproof bays. Each partition is provided with a heavy, iron, fireproof door, set on hanging trolleys and adjusted at an acute downward angle. These doors are held open by means of substantial sash cords having heavy iron weights attached. Should a fire occur the cord would be consumed, the

weights would be released and the door would automatically close. Thus the fire would be confined to the room in which it started and the damage be limited to the contents of that room.

Each of these storage floors has a washing platform so arranged that six men may work on a car at one time and dispose of it with great dispatch. To further facilitate matters, the floors slope toward a gutter running the whole length of the room and hose is attached to the wall at convenient intervals.

The fourth and top floor is given over to a perfectly equipped repair department to which "dead" cars are carried by means of two elevators, 18x20 feet. The total capacity of the garage is seven hundred cars.

An interesting feature connected with the construction of the building is that it was here that Bethlehem rolled section beams having a clear span of 40 feet were used for the first time.

A very interesting feature of this garage is the system provided for the storage of gasoline. The manner in which it was installed effected a saving of $30,000 a year for the Taxi-cab Company in insurance premiums. The method of installation was as follows: The tanks are encased in solid concrete sunk in a pit 12 feet deep, situated twenty-five feet from the main structure and divided from it by a heavy fireproof brick wall. Access to this pit is obtained through two manholes. Each of the eight delivery pipes terminates in a length of flexible tubing to the end of which is attached a filling nozzle. When not in use, these tubes are drawn up out of the way by means of a counterweight. The tanks are provided with the gravity system, so that water rises in the tank as the gasoline becomes depleted, and thus evaporation and the formation of gases is prevented.

PART IV

Motor Boat Garages*

FOLLOWING close upon the motor car, came the motor boat, and great as has been the popularity of the automobile, that of the motor boat has greatly exceeded it. Indeed, the vogue of the little power craft is little short of marvelous. No stream or lake, apparently, is too shallow or too muddy to have its fleet of "put-puts," and as for the waterways and harbors along the coasts, they are literally infested. Necessarily, as in the case of the automobile, they have caused the evolution of a new form of architecture, the motor boat garage.

CANVAS SHELTER AT BROCKVILLE, ONT., CANADA

It is especially necessary to protect the high-powered and finely finished boats from the weather, and on most freshwater lakes and tideless rivers, this is accomplished by housing them in some kind of boat house. In many cases where the owner was already in possession of a boat-house, it has been made over or added to, thus providing accommodations for the motor boat. This can often be done with very satisfactory results and

TWO-SLIP BOATHOUSE LOCATED NEAR ALEXANDRIA BAY, N. Y. OWNED BY J. W. SLAWSON

*Illustrations and information from an article by Laurence La Rue in "Yachting."

BOAT GARAGE LOCATED NEAR ALEXANDRIA BAY, N. Y.
OWNED BY W. B. HAYDEN

with comparatively slight expense but, generally speaking, it is best to start afresh and build a shelter especially for the motor boat.

The simplest and least expensive shelter is one constructed of canvas stretched over iron hoops. Assuming that the owner has already a substantial dock or pier along his water front, he has nearly half of his shelter ready made. A row of piles driven into the river bed, parallel with his pier and about four feet more

BOAT-HOUSE WITH LEANTO, NEAR ROCKPORT, ONT., CANADA

A COVERED SLIP

than the width of the boat from it, with a stout timber secured along the top, will give him support for his hoops. A heavy pier with cribs well weighted will offer greater resistance to ice pressure and other weather conditions, but will of course be more costly, as well as more permanent.

To both piers, the iron hoops are secured in iron sockets, and the canvas is stretched over them, making thus a shelter straddling

TWO-STORY BOAT-HOUSE LOCATED NEAR ALEXANDRIA BAY, N. Y. OWNED BY W. B. HAYDEN

ELABORATE GARAGE LOCATED NEAR ALEXANDRIA BAY, N. Y.
OWNED BY GEORGE R. BOLDT

the slip between the piers. The hoops should be long enough to furnish sufficient head room so that occupants may get in and out of the boat without bumping their heads. A sufficient width of the platform over the pier should also be enclosed within the canvas covering to afford a landing platform.

This method of constructing a shelter, since it is intended for the summer months only, and must be taken down and put away during the winter time, may also be applied to streams where the rise and fall of the tide makes a stationary boat house impracticable. In this case, the boat owner commonly anchors a

MOTOR-BOAT GARAGE LOCATED NEAR ALEXANDRIA BAY, N .Y.
OWNED BY A. R. PEACOCK

float outside of his pier and connects the two with a sliding runway. If two floats were firmly anchored in the position of the two piers above described, the hoops and canvas could be attached to them in the same way. The superstructure and floats must of course be removed and stored in winter.

In many cases, however, the rise and fall of the tide is not the only hindrance to the construction of a boat house along shore. Tidal streams have generally on one side or both, "flats" which become covered in summer with a heavy growth of grass. Progress through this with any kind of motor is difficult if not actually impossible. The only thing left for those who inhabit the shores of such streams is to anchor, safely and securely, outside of the flats, a buoy to which they may tie their craft, and to provide a stout waterproof covering for the cockpit and motor.

It is possible and practical to apply the idea of the hoop and canvas covering to a structure of more substantial and permanent character, and larger size. The first cut on Page 91 shows one built after this fashion.

The second cut on Page 91 shows a small but very satisfactory structure with two slips, and excellent dock facilities.

A method of reconstructing an old boat house to provide accommodation for the motor craft is the ever-useful lean-to. The second cut on Page 92 is a good illustration of what may be done by this means. The pile construction is not substantial enough for the additional pier to support the lean-to, and a heavy crib, well weighted, should be built and allowed to settle until a steady bottom is reached. The roof of the original structure may be extended to cover the lean-to, if this will allow headroom enough, after which it is a simple matter to enclose the other side and the two ends. If the sides of the slip are lined with plank to a depth of a few feet below water level, it will not only improve the appearance of the interior, but will prevent the boat from catching under the edges of the floor in case the water should recede a foot or two.

The first cut on Page 93 shows another very simple form of construction. It is simply a cover built over a slip in the dock.

If the boat owner has not a boat house, he is not subjected to the temptation of converting it into a garage, and can begin with a clear conscience to erect a shelter purposely for his boat, which is certain to prove more satisfactory. A carefully planned motor garage should contain, as well as storage for the boat, a

repair shop in which it may be overhauled. It is a good plan to allow plenty of room for dock space on both sides. This not only adds to the appearance of the structure, but is useful in pleasant weather, and when one side is rendered useless by high winds the advantage of another on the leeward side needs no explanation.

The two illustrations of Page 94 show houses built to shelter boats with masts.

PART V

Garage Equipment and Appliances

THE building of a structure to house the automobile is only a part of what is required to properly care for and maintain it. The equipment of a perfectly appointed garage requires many special appliances and appointments which are both necessary and great savers, both of labor and time, whether it be a small garage for one machine wherein the owner expects to do his own work and care for his own automobile, or the largest garage of a public character where many machines must be taken care of and the owners wish to get the greatest economy in service and the highest return on their investment of capital.

FIRE PRECAUTIONS

If we turn to the garage regulations of the Fire Department of the City of New York, we will find many rules, which are the result of common sense and experience, laid down for the equipment and maintenance of a garage. Broadly, the regulations cover the housing of automobiles carrying volatile, inflammable liquid, the storage of volatile, inflammable liquid, and the storage of calcium carbide. In safeguarding the dangers involved in the three cases mentioned above, the whole fabric of garage regulations has been built up. They are just and sensible, and are approved by the Board of Fire Underwriters, and where observed with care and exactness, reduce fire insurance premiums to a minimum. The restrictions put upon public garages are necessarily more exacting than in the case of private garages, but the same principles apply and it is mainly a case of quantity and not of quality.

The means of fire prevention consist of the proper storage and handling of gasoline and inflammable oils and materials, and will be discussed more fully later. The means of fire protection in case of an accidental blaze are the usual precautionary measures provided; alarm systems, automatic sprinklers, chemical extinguishers, both liquid and dry, and the provision of pails of dry sand, which, while one of the most simple, is one of the most effective of extinguishers for a gasoline blaze.

GARAGES AND MOTOR BOAT HOUSES

In an addenda we have printed the latest garage regulations of the City of New York as a useful guide to any one who is about to build or plan a garage no matter of what character. The methods of heating required are the indirect methods with the heating apparatus secluded in separate rooms or vaults, completely isolated from the storage space. For a small garage heat may be taken from the house nearby where there is a steam heating system. Electric lighting is required according to New York regulations and is everywhere advisable. Where there is electric lighting in the house the circuit may easily be extended to the small garage near by. For large garages the regulations should be followed carefully as to the position of all switches and outlets so that the danger of explosion from an accidental spark is minimized. This also applies to power and where electric motors for running machinery or operating elevators are installed, it is necessary that they be enclosed in separate fire proof compartments where no spark may accidentally ignite gasoline fumes. The laws concerning smoking are also definite and positive, and in commercial garages it is required that notices reading "No Smoking" displayed in large letters shall be posted on each floor and at all entrances.

While in the large cities, strict regulations are being enforced, of which all the large garage owners realize the advantage because of the reduction in insurance premiums where extra precautions are taken, throughout the country districts, especially in the neighborhood of summer resorts, like precautions are less often observed, and it is not uncommon to find immense wooden barns constructed for the summer accommodation of automobiles. In every respect in these buildings, the provisions are lax for fire prevention and it is really remarkable that many disastrous fires have not occurred with the inevitable destruction of large numbers of valuable machines. The fire risk of frame garages of this character is not alone confined to the building itself and its contents, but as they are usually located near hotels, the transmission of embers by explosions and the wind may readily jeopardize the hotel buildings. In the matter of fire protection, the conditions are equally bad, for as a rule the equipment is of the scantest, and poorest. Whatever there is, is provided by the owner, as in remote country resorts there is seldom public fire protection. The danger to capital is large, and the risk to life cannot be too greatly emphasized.

With the large increase in the automobile interests, it cannot

be long before the state authorities will take into their hands the matter of fire regulation for protection in the construction of garage buildings throughout the country districts similar to the regulations already promulgated by most of the larger cities.

The National Fire Protection Association has already taken up the matter of garage construction and the committee report is of interest. We give it below.

"COMMITTEE report, F. E. Cabot, chairman, to the National Fire Protection Association: For the purposes of this report garages shall be divided into the following classes; (1) Public garages; (2) private garages. Throughout the report the word "automobile" shall mean a vehicle designed to be propelled on a road by the explosion of an inflammable liquid or by steam using an inflammable liquid as fuel. The definition of a public garage shall be a garage containing (1) cars used for public livery purposes; (2) for the accommodation of cars for which storage is paid when more than three in number; (3) garages having accommodations for more than ten automobiles. Public garages shall be divided into the following classes: (1) Those containing automobiles which are the property of one concern, used for delivery, express or similar purposes not exceeding twenty-five in number; and (2) garages containing automobiles for the storage of which a fee is paid and garages used for the storage of automobiles, the property of one concern, more than twenty-five in number.

GENERAL RULES TO APPLY TO ALL GARAGES

"(1) *Floors.*—All floors on which automobiles are stored shall have a surface which will not absorb oil unless the floor is of dirt, and such surface shall be of non-combustible material.

"(2) *Storage Levels.*—No automobile shall be stored below the level of the surrounding land unless the floor on which they are stored has openings not less than three feet high above the grade of the surrounding land on two or more sides and has at least one exit directly to the outer air or to a stairway enclosed in brick, terra-cotta, wire lath and plaster or reinforced concrete with standard fire doors on the opening.

"(3) *Walls.*—All garages, if located within thirty feet of any building occupied as a public building, that is, a State, city or county administration building, detention buildings including hospitals, reformatories, prisons and police stations; school buildings, assembly halls, including churches, convention halls, exposition

buildings, railroad depots or any building containing an assembly hall for a concourse of more than one hundred people, theaters, offices, tenements or dwellings except the dwelling of the owner of the garage, shall be of brick and shall have a clear space on all sides except the street line, if of fireproof construction, of five feet. If of brick walls with wooden floors, eight feet. If of frame, ten feet; provided that when such buildings are or are to be located in a block between street lines it will be built with dead brick walls along the lot lines of spaces nearer than the provision given above.

"(4) *Gasoline Tanks.*—Storage tanks for gasoline shall be installed in accordance with the following rules:

"Must be located underground below the level of the lowest pipe used for filling the tank or delivering the gasoline and preferably at least ten feet from all buildings. If within ten feet of any building it must be located below the level of the cellar or basement unless a concrete wall is built running at least a foot below the cellar bottom and two feet beyond each end of the tank between tank and the building.

"Must be constructed of iron or steel plate securely riveted or pressed in to form. Tanks should be galvanized or painted on the outside with rust-proof paint. Must be provided with fill pipe and vent pipe. When the tank is within ten feet of any building the vent pipe must rise above the highest opening of any such building. Must have a disc of 60 mesh brass gauge wire gauze inserted and a return bend or goose neck on top. Where this vent pipe is not required, the fill and vent pipes must be so arranged that the fill pipe cannot be opened without also opening the vent and must terminate in an iron box, the cover of which should be practically flush with the ground and should be locked.

"No gasoline shall be kept in any garage except that contained in the reservoirs of automobiles and in the measuring pumps used for filling, provided, however, that there may be not exceeding one barrel in a portable tank of a type listed by the National Board of Fire Underwriters, and also not exceeding two quarts for cleaning purposes kept in and used from a metal safety can.

"If the pump for emptying the gasoline storage tank is located within any building it must be a *listed* measuring pump, but when used outside of the garage and not less than ten feet from other buildings a suction pump of the ordinary type may be used.

"No filling, emptying or opening of any gasoline reservoir

of any automobile shall be done when the same is within the garage except by daylight or incandescent electric light and no artificial light, blaze or fire shall be allowed in the room where and when such reservoir is open.

"(5) *Wiring.*—All wiring to be in accordance with the National Electric Code.

"(6) *Electrical Devices.*—No electric device, the operation of which may produce sparking, shall be located in any room in which the filling of the gasoline tanks on machines is permitted except by written permission of the inspection department having jurisdiction.

SPECIFIC RULES

"*Wooden Buildings.*—Garages of *frame* construction shall be located not less than thirty feet from all other buildings except that garages containing not more than two machines may be less than thirty feet from the dwelling of the owner. Such garages shall not be more than thirty feet in height and shall not have shingle roofs.

"*Public Garages.*—Public garages, capable of containing more than ten machines, if of frame construction, shall be fifty feet from all other buildings. If of brick walls with wooden floors and roof, they shall not be located in the congested districts of cities, and shall have all openings protected with standard fire doors or shutters or wire glass windows.

"*Fireproofing Requirements.*—All elevators and stairways shall be enclosed in brick or reinforced concrete walls with approved fire doors on all openings.

"In buildings of fireproof construction all weight bearing metal shall be protected in an approved manner.

"In buildings of other than fireproof construction, all weight bearing metal shall be properly protected against damage by fire by brick, terra-cotta or reinforced concrete having a minimum thickness of two inches.

"In such buildings all elevator and stair wells, light and vent shafts shall be enclosed in brick, terra-cotta, reinforced concrete or expanded metal plastered with hard plaster."

HEATING AND VENTILATION

The heating and ventilation of a garage are points that must be considered alike in the smallest and most modest building for a single machine, and in the great commercial buildings that house

many. Careless methods in either case court disaster. The small building naturally commands our first attention and is most interesting to many. The only absolute requirement for heating is that the temperature shall never get so low as to freeze the water in the pipes and tanks of a gasoline car, or that in the boiler of a steam car. Of course, it will occur to the reader that it is possible to use a non-freezing solution in pipes and radiator of the automobile which may be accomplished by the addition of glycerine, common salt or other chlorides according to many formulæ. However, while this may do in an extremity, an unheated building always possesses a disadvantage, for working about cold machinery in winter weather is not comfortable, and some provision for heating enters the mind of every garage owner. To provide heat for a small garage is a more troublesome matter to the individual owner than the heating of a large commercial building. Direct heating by gas or oil stoves within the structure is out of the question as the risk is far too great. All these direct heaters to be efficient must be located near the floor, and this is the particular point where the greatest danger occurs as the gasoline fumes are naturally heavier than air and accumulate mostly at the lowest level. Some arrangement must be made to place the fire where inflammable vapors cannot come in contact with it. This may be accomplished by placing the heating apparatus within a completely isolated compartment in the main building or else in an outside or adjoining building which is not entered from the main building—by far the better plan. For a small garage a lean-to may be built to contain the stove which may be of any type according to the choice of the owner. The stove should be most properly placed in a metal sheathed compartment so that if hot air heating is used, the heated air does not come in direct contact with the fire. If hot water or steam is used as a medium, complete isolation of the fire room from the main building is equally necessary, but more easily accomplished.

For heating large garages, steam or hot water systems, with the heating apparatus in separate or adjoining but completely isolated buildings, are to be recommended. Where the heating apparatus must be included within the same building which is the case in city structures, the laws provide for the placing of the heating apparatus in isolated vaults which are entered from the outside of the building and have no connection with the interior whatever.

In the matter of ventilation, a garage must be ventilated from the bottom for, as before mentioned, the gasoline vapors are heavier than air and naturally settle to the floor. Venting a garage from top openings will naturally draw off foul air, but will not remove gasoline fumes. A simple method of ventilation for a small garage is to install an ordinary stove pipe, opening near the floor and venting at the roof. If this pipe is heated part way up the wall by contact with a radiator or by passing before a register, the natural expansion of the air within will cause a circulation and produce the desired ventilation. If this is not feasible, the pipe may be brought out through the side and jacketed by the smoke pipe from the heater in the adjoining building; the air within it will thus be sufficiently heated to cause a draft and draw the vapors up through it from the floor. This method is obviously attended with more risk than the first scheme. A mere opening at the floor level would not accomplish the result of ventilating the building, as the draft would naturally be in and not out, and would only result in diffusing the gasoline vapors.

In large garages, methods of forced ventilation may be adopted with success to clear cellars and floors. A word of warning is not inappropriate here as to placing heating apparatus or forges, etc., in open basements, as here is the point where the greatest amount of dangerous fumes are apt to accumulate and is naturally the most dangerous point for fire.

TURNTABLES

The appliances for working in a garage are many and the most important of these are various devices for handling and working on the cars as a whole. Turntables of several types are manufactured which turn flush with the floor and are built into pits. Still other types are obtainable which may be installed on a flat floor and give satisfactory results. The turntable, however, is a device which pertains more to the large garage, and is an expensive installation for the private owner. For handling machines in a garage which will house from two to five automobiles, roller devices are manufactured which may be slipped under the wheels of a car, and acting as castors, make possible easy moving and short turning of the machine.

The Automobile and Accessories Manufacturing Company of Baltimore, Md., manufacture permanent turn-tables and also the "Norwood" castor. Together with this they have lately

brought out a two-ton jack which fits on the top of the castor. This is a very handy device in the shop and garage, and one that will prevent much damage in handling automobiles, especially in shipping machines and moving them in and out of cars and buildings.

REPAIR PITS, STATIONARY AND PORTABLE HOISTS

Next in importance, the repair pit and other appliances for working under the automobile come into consideration. Repair pits should always be built and lined with concrete and preferably coated with impervious cement within. Furthermore, it is advisable to provide them with suitable drains. Waste drippings of gasoline, etc., collect through carelessness in the repair pit and may readily lead to destructive fires, and if the repair pit is built and lined with wood, the danger is many times multiplied. Where it is not convenient to build a repair pit, a handy substitute is to build a platform, 30 inches or so above the floor, of heavy planks a foot or more wide and guarded at the sides, on to which the car may be run with inclined planks. This arrangement makes it possible to work below a car, and when not in use such a supporting platform may be set aside out of the way. Some of the garages previously described in this book are provided with tackle hoists by which the front or rear of a machine may be raised off the floor and thus afford access to its under side. Still others have been provided with crane hoists which run on travelers so that heavy portions of the machine such as the engine may be lifted out and set one side. All such appliances are convenient. A portable hoist is on the market which consists of a moveable base with an overreaching crane arm carrying a tackle by which an automobile may be lifted, front or rear. This is a convenient and useful device.

A jack for lifting an automobile is usually supplied with the equipment of the machine. The variety of styles in which these jacks are manufactured is almost unlimited, but they are mostly of the double acting ratchet type which has sufficient strength to lift any type of automobile. A substantial jack is a convenient appurtenance in the garage and a light, portable jack is a necessity in the road repair kit of an automobile. In some types, the handle is removable and is shaped to form a handy tire tool.

The Lane Brothers Company of Poughkeepsie, N. Y., manufacture jacks of various types which are suitable for automobile use. They also manufacture door hangers which are inevitably

necessary on the large sliding doors of all garages. The types they manufacture are easy running and adaptable to varied constructions.

FLOORS

The floor of garages should always, both for convenience and for safety, be concreted and surfaced with cement or other impervious composition of which there are several types in the market, to make them as impervious as possible. The floor should be graded to a low level for drainage and in large garages special places should be provided for washing and cleaning. Where the drainage from a garage enters into the city sewers, oil traps should be placed in the sewer line to collect oil and waste and prevent danger of explosions in the sewers. In many cities such oil traps are required by law.

WASHING AND CLEANING DEVICES

Devices for the washing and cleaning of automobiles are procurable such as rotating, swinging arms at the ceiling with hose connection by means of which a machine can be easily cleaned. Many types of nozzle with sponge washers are obtainable in the market. The washer arms as a rule are provided with electric light attachments which move with them.

LIGHT ATTACHMENTS

Portable electric light attachments for working about automobiles are also a great convenience. The ordinary lamp on the end of a flexible cord is useful, but standards with long flexible arms are also obtainable which make possible the convenient placing of a lamp near the working point. The bulb should always be protected by a wire cage in all portable lighting attachments to prevent accidental breakage.

WORK BENCHES AND TOOL CABINETS

An important feature of garage equipment is a substantial work bench, and a great convenience accompanying this is a good tool cabinet. A substantial bench and a kit of ordinary tools are generally sufficient for the private garage where the owner expects to do light repair work on his own machine. In larger private

garages where the owner employs a mechanic it is often practical to install a lathe, drill press and in an outside compartment, a forge, but such equipment is usually unnecessary as it is cheaper to have heavy repairs done at the automobile factory. In public garages, the repair department is an important and lucrative portion of the equipment and the machine shop is elaborate and well equipped, containing all appliances for machine work, welding and repair on the engine and the chassis of the car. Moreover, it is not unusual to find a shop for the wagon maker and space for painting and varnishing the bodies of cars. Besides this the equipment for tire repairs is an important item.

TIRE INFLATION PUMPS

No more laborious occupation is to be found than the hand pumping of tires on an automobile, and many are the devices which have been invented and marketed to avoid the unpleasant process of pumping tires. The outfits manufactured by The Gardner Governor Company of Quincey, Ill., are simple and serviceable. Such appliances are an absolute necessity in the commercial garage, and may not be considered a luxury for the man who has a private garage containing more than one machine. A compact form of the pumping apparatus is shown in the accompanying cut. This consists of a motor-driven air compressor and compressed air reservoir, all combined in the same stand. The small space occupied and the advantage of always having compressed air on tap from which tires may be inflated to a uniform and even pressure, increases the economy of the tires and adds enormously to the satisfaction of an automobile owner.

LOCKERS

In the private garage good closet space is never regretted by the owner for there is always much more to take care of than is originally anticipated. Robe racks and closets for hanging motor apparel are always useful. Usually an owner will not make a mistake in putting in the best, and in this respect good metal lockers are by far the most economical of room, the most easily cleaned and the least destructible. In public garages where owners

hire space for their cars, the usual allowance is two large lockers with each car stored, and the locker rooms with their accompanying toilet rooms and dressing rooms, in the large garages, are an important item in the architect's plan and affording space for them is a matter of careful study to maintain the economy of the building.

SYSTEMS OF GASOLINE STORAGE

The storage of gasoline is the most important item of any in the equipment of the garage. Proper storage of this fluid is absolutely necessary, both from the stand-point of economy and from the danger of explosion. There are a variety of systems on the market, operating on several different principles, but we shall endeavor to describe here only a few equipments.

Among the best of the systems for gasoline storage are the varied types manufactured by S. F. Bowser & Company, Inc. We shall describe a few of their equipments.

First, for the storage of gasoline a proper tank is necessary. The Bowser tanks are made of galvanized steel, carefully riveted, with soldered seams and finished with three coats of asphaltum, making the tank rust-proof, so that when buried in the ground it is fully protected. Underground storage preserves the efficiency of the gasoline by keeping it at an even temperature and preventing evaporation. The tank may be placed as far from the garage as desired, and absolutely protects the owner from danger of a tank explosion. The filler pipe to the Bowser tank consists of a heavy outer pipe with an inner filling tube which extends to the bottom of the tank, and which is fitted with a fine screen to strain the gasoline. The top of this filler pipe is fitted with a patent filler pipe cap with an automatic ball valve air vent. This valve prevents vacuum in the tank when the gasoline is being drawn and seals the tank when the pump is inactive. It possesses a locking device so that the opening may be closed securely. To measure the amount of gasoline in the tank a gauge stick is used.

Usually in cities it is necessary to vent the gasoline tanks above the roofs, and in this case a special vent pipe must be extended from the tank to the roof of the garage. The vent pipe terminates in an air vent protector of "T" shape, the openings of which are protected with double wire gauge fire screens. Tanks may be made of any desired capacity and of thicknesses to meet the regulations which are in effect in various parts of the country. Pump devices within the garage building to be used in connection

with the storage tanks without the building are of two general patterns—measuring pumps and non-measuring pumps.

The Bowser measuring pump will discharge an accurate gallon, half-gallon, quart or pint at a stroke as desired. It is a necessary appliance in all commercial garages and a useful one in the private garage. The pumps are built entirely of metal with cylinder, plunger rod, stuffing box, etc., made of brass. They are extremely well made as is necessary for such an appliance. They have a discharge register which automatically tallies the number of gallons pumped and a locking device which prevents waste or use of gasoline by persons not in possession of the key. One of the other types of pump used is the non-registering pump, which is double acting and gives a continuous flow of gasoline. It is as well made and possesses all the advantages of the other types with the exception of the registering device. Special anti-drip filling nozzles are provided and besides the stationary nozzle at the pump, a gasoline hose with connecting nozzle, which makes it possible to pump directly into the tank on the car, may be procured. The Bowser centrifugal filter is a useful device which thoroughly filters the gasoline as fast as it is pumped before it goes into a car. All water or other impurities which may be in the gasoline, are eliminated without straining it by any method.

Another type of Bowser storage tank which is more adaptable for suburban or country service, and for persons possessing country homes, is the storage tank which is buried in the ground with pump connection directly above it. The tank and filling pipe need no further description, but the pumping outfit may be further described. One pattern consists of both filling and suction pipe extending above the surface of the ground with covering caps. The pump, being detachable, may be put on only when the gasoline is needed. It discharges on the down stroke and is so arranged that the gasoline may be discharged out of the hose and cylinder by simply returning the plunger to the bottom of the pump cylinder.

A low-priced "long distance" outfit, which should be popular with private motorists because of its convenience, safety and economy, is known as the "Pony" outfit. This has a well built, simple pump working with an up-and-down stroke, and for a small garage is as efficient and useful as many more expensive equipments.

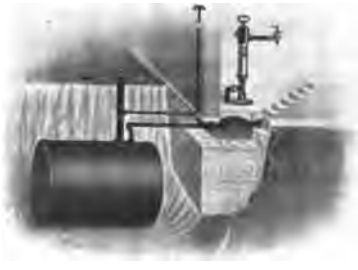
These four outfits which we have illustrated here are avail-

LONG DISTANCE GASOLINE STORAGE SYSTEM
WITH MEASURING PUMP

ROLL TOP LUBRICATING OIL CABINET

LONG DISTANCE GASOLINE STORAGE SYSTEM
WITH NON-MEASURING PUMP

GASOLINE STORAGE OUTFIT WITH DETACHABLE
PUMP



"PONY" LONG DISTANCE OUTFIT

SOME OF THE VARIOUS TYPES OF BOWSER STORAGE OUTFITS

able for practically every class of gasoline storage and they should meet the needs of most owners.

For the use of motor boat garages, the tank type first described with a measuring pump is to be recommended. However, the cabinet outfit which may be set up on the floor of the boat house with the pump above it may in some cases be most desirable.

The storage of lubricating oils may best be provided for by means of lubricating oil cabinets. Where more than one grade of lubricating oil is required, several tanks and pumps may be combined within one cabinet to advantage. This may be the case especially in the commercial garages.

Bowser systems of storage are installed in many of the garages illustrated in the earlier parts of this work, in both the private and commercial buildings, in the descriptions of which the Bowser system is referred to.

A system of gasoline storage differing entirely from the one above mentioned is known as the Hydraulic System of gasoline storage and is manufactured by the Hydraulic Oil Storage Company. The principle upon which the system works is that gasoline is naturally lighter than water and will float upon its surface, and the system is operated by the difference in the specific gravities of the two liquids. To draw gasoline no pump is necessary. When the water valve is opened the gasoline naturally flows until shut off, being forced up by the weight of the water admitted from a tank supply similar to the flush tank used on sanitary appliances. The system is an efficient one, giving economy in the use of gasoline and preventing evaporation.

Another advantage of the system is that the gasoline is never exposed to the air, and that the tank is always full. The feed is from the top of the tank and all sediment or dirt that is in the gasoline naturally settles to the bottom of the tank and into the water. No vent pipe is necessary on the system as there are no gases to escape. There is no gasoline valve on the system as the flow is controlled by the water valve; admitting more water causes the gasoline to flow. The storage tank can be located either within or without the building as desired. The system is supplied with a gauge which shows the quantity of gasoline in the storage tank at all times. This system was used in the Taxi Cab Company garage, New York City, which is illustrated in the Fourth Part of this book.

The City of New York Garage Regulations

Resolution adopted at a meeting of the Municipal Explosives Commission held at the Headquarters of the Fire Department, City of New York, December 20th, 1905, amending the regulations of the Municipal Explosives Commission, and establishing Garage Regulations for the City of New York.

Resolved, that sections thirty-eight, thirty-nine, forty, and forty-one of part seven of the Regulations of the Municipal Explosives Commission be and are hereby repealed; and be it further resolved that the Regulations of the Municipal Explosives Commission be and are hereby amended by adding new part number ten, to be known as the Garage Regulations of the City of New York, and to read as follows:

PART X

GARAGE REGULATIONS.

SEC. 1. TITLE.

These Regulations shall be known as the Garage Regulations of the City of New York.

Approved December 28, 1905.

SEC. 2. DEFINITIONS.

Certain words used in these regulations are defined for the purpose thereof as follows:

1. "Approved" means approved by the Fire Commissioner;
2. A "Volatile inflammable liquid" is any liquid that will emit an inflammable vapor at a temperature below 100° F. when tested in—
   a. The open air, or—
   b. The closed pyrometer of Guiseppe Tagliabue;
3. An "Automobile" is any self-propelling vehicle;
4. A "Garage" is—
   a. That portion of a building in which any automobile carrying volatile inflammable liquid is kept, whether said automobile be kept for use, for sale, for rental, for exhibition, or for demonstrating purposes, and—
   b. All that portion of a building that is on or below the floor or floors on which an automobile carrying a volatile inflammable liquid is kept, and is not separated therefrom by tight, unpierced fire-walls and floors.

Approved December 28, 1905.

SEC. 3. AUTHORITY FOR THESE REGULATIONS.

These regulations are established under authority of two separate ordinances adopted by the Board of Aldermen May 13, 1902, and approved by the Mayor May 19, 1902, each entitled "An ordinance to regulate the sale, use, and transportation of explosives in the City of New York."

Approved December 28, 1905.

SEC. 4. PROHIBITIONS.

An automobile carrying a volatile inflammable liquid shall not be placed in a building that has not been licensed as a garage by the Fire Commissioner.

Approved December 28, 1905.

SEC. 5. VIOLATION, A MISDEMEANOR.

Section 389 of the Penal Code provides that "A person who makes or keeps gunpowder, nitro-glycerine, or any other explosive or combustible material, within a city or village, or

carries such material through the streets thereof, in a quantity or manner prohibited by law or by ordinance of the city or village, is guilty of a misdemeanor."

Approved December 28, 1905.

SEC. 6. LICENSES.

Licenses shall—

1. Be issued—
   a. By the Fire Commissioner,
   b. Subject to all the conditions of these regulations, and such further restrictions as the Fire Commissioner may deem necessary.
   c. For the term during which all the conditions and restrictions are strictly observed, for the period of one year;
2. Terminate immediately on any violation of these regulations or the restrictions imposed by the Fire Commissioner;
3. Be revoked by the Fire Commissioner should he deem that the interest of public safety so demands;
4. Not to be issued for a building—
   a. Occupied in any part as a dwelling, an hospital, a theatre, a church, a school, or as a boarding, lodging, or tenement house,—the only exception to this provision is that a license may be granted for a private garage in a building occupied in part as a dwelling by the family of an owner, a lessee, or an employee; but in case the said building in which the private garage is to be located is of fireproof construction throughout, and the living apartments are separated from the garage by unpierced fireproof walls and floors, the same may be occupied by two families, each of which shall be the family of an owner, a lessee or an employee of the licensee.

Approved September 19, 1907.

   b. Where, at any one time, more than ten people congregate in a portion of the building that is outside of the garage and is not separated therefrom by unpierced, approved fire-walls and floors;
   c. Where all sewer connections from washstands and sinks are not provided with an approved oil trap with a glass gauge pipe and a draw off cock, in a readily accessible place.
5. Not authorize the keeping of more than—
   a. Ten gallons of volatile inflammable liquid in approved safety cans,
   b. Thirteen hundred and seventy-five gallons (25 bbls.) of volatile inflammable liquid in underground storage tanks,
   c. One hundred and twenty pounds of calcium carbide in air-tight containers;
6. Be issued for a garage at an annual fee of ten dollars, and may authorize—
   a. The keeping of—
      (1) Automobiles carrying volatile inflammable liquid,
      (2) Volatile inflammable liquid,
      (3) Calcium carbide;
   b. The sale of—
      (1) Volatile inflammable liquid for filling the tanks of automobiles by transferring such liquid from the underground storage tanks into the tanks of

automobiles on the premises of the garage,

(2) Calcium carbide;

7. Be issued for a private garage at an annual fee of two dollars and—

a. May authorize the keeping of—

(1) Automobiles carrying volatile inflammable liquid, provided that all such vehicles are used for the licensee's individual use, and are neither rented out nor used to carry passengers for hire,

(2) Volatile inflammable liquid for use in such automobiles,

(3) Calcium carbide for use in such automobiles.

b. Shall not authorize the sale of—

(1) Volatile inflammable liquid,

(2) Calcium carbide.

Approved July 20, 1906.

SEC. 7. SAFETY CANS.

Approved safety cans for storing volatile inflammable liquids in a garage shall be of a capacity of five gallons or less, and when not in use shall sit in drip pans, either in a pump house or in an approved closet.

a. Portable filling tanks for transporting volatile inflammable liquids from the storage tank to the automobile may be used under the following conditions:

1. Application must be made to the Fire Commissioner for a special permit in the case of each tank to be used.

2. The tank must be kept only in the pump house or in a storage closet of approved construction when not in actual use.

3. The construction of the tank and its carriage must conform to the following specifications and must otherwise meet the approval of the Fire Commissioner.

4. Specifications—The tank shall, if cylindrical, have concave heads, the body 1/8-inch mild steel, the heads of the same material, 3-16-inch thick; if rectangular the tank shall be made of 3-16-inch mild steel throughout. All joints shall be riveted and caulked and all pipe connections shall be reinforced. The capacity of the tank shall not exceed 50 gallons. The tank shall be carried on a strong iron frame, firmly attached to it and provided with rubber tired wheels. The tank shall be discharged by pumping and not by air pressure, and the outlet shall be free from leakage when the pump is not working. No hose attached to the tank shall be more than eight feet in length. All hose connections shall be Keystone brass unions.

Approved July 2, 1907.

SEC. 8. SAFETY CAN CLOSETS.

Closets for storing garage safety cans shall—

1. Not be larger than required for the purpose;

2. Be lined inside and covered outside with sheet tin applied with lock joints and blind nailed;

3. Be ventilated to the outer air;

4. Be in an exposed location.

Approved December 28, 1905.

SEC. 9. DELIVERY OF VOLATILE INFLAMMABLE LIQUID.

The delivery of volatile inflammable liquid to a garage shall be made in daylight only and shall be made—

1. In barrels or safety cans, or—

2. From a barrel wagon.

Approved December 28, 1905.

SEC. 10. DELIVERY IN BARRELS OR SAFETY CANS.

The barrels or safety cans in which volatile inflammable liquid is delivered to a garage shall immediately be—

1. Placed alongside intake of filling pipe,
2. Emptied into tank by means of a pump or siphon, and—
3. Removed from the premises forthwith.

Approved December 28, 1905.

SEC. 11. DELIVERY FROM BARREL-WAGONS.

Barrel-wagons delivering volatile inflammable liquid to a garage—

1. Shall be provided with a metallic hose and an automatic shut-off valve at hose coupling to barrels on wagon;
2. Shall not enter the building;
3. Shall couple hose to filling pipe connection outside of building.

Approved December 28, 1905.

SEC. 12. STORAGE TANKS.

Storage tanks shall—

1. Not be installed until application with plans and specifications showing full details of location and construction of tank and all connections, has been approved by the Fire Commissioner;
2. Not be placed—
   a. Under a sidewalk or in a sidewalk area unless it shall be shown to the satisfaction of the Fire Commissioner that there are physical conditions that make it impracticable to install it elsewhere; nor—
   b. Inside any building that is more than one story high, or that has a cellar or a basement;
3. Not have a capacity in excess of two hundred and seventy-five gallons;
4. Be made of iron or steel at least three-eighths of an inch in thickness;
5. Be coated on the outside with tar or other rust-resisting material;
6. Have all joints tightly caulked;
7. Be tested by hydrostatic pressure, one hundred lbs. to the square inch;
8. Have all pipe connections at the top;
9. Be buried at least two feet under ground, and in addition to being two feet under ground,
   a. Tanks that are to be filled by a pipe from the street shall be buried at least two feet lower than the grade of the street,
   b. Tanks that are within ten feet of any building shall—if practicable—be buried two feet lower than the level of the lowest cellar floor in any such building;
10. Be embedded in twelve inches of Portland Cement concrete, well tamped in place, and—
   a. Should there be more than one tank, they shall be separated by at least twelve inches of such concrete, and—
   b. Should a tank be within ten feet of a building and not be buried at least two feet lower than the level of the lowest cellar floor of such building, it shall be embedded and surrounded by Portland Cement concrete twelve inches in thickness to top of tank;
11. Be provided with a filling pipe, a vent pipe, and (if not more than thirty feet from all buildings) a drawing-off pipe;
12. Be provided with an approved pump or with an approved pressure apparatus for drawing off contents;

13. Not to be placed so that the top of tank shall be below the drawing-off point.

Approved December 28, 1905.

SEC. 13. VENT PIPE.

The vent pipe shall be—

1. Made of one-inch or larger wrought iron pipe, with—
   a. Heavy cast iron fittings,
   b. Screw joints made with litharge and glycerine;
2. Connected with top of storage tank;
3. Provided with a screen of thirty mesh brass wire at or near the tank connection;
4. Carried up to the outer air, be well braced in position, and—
   a. Either capped with a double goose neck with openings—
      (1) At least ten feet higher than the roof of the garage,
      (2) More than twenty feet from all windows in higher adjacent buildings, and—
      (3) Covered with a brass wire screen of one-sixteenth-inch mesh;
   b. Or closed by a shut-off cock so arranged that the filling pipe cannot be opened without opening the vent, and the opening to the shut-off cock shall be—
      (1) Directly over storage tank,
      (2) More than thirty feet from all buildings,
      (3) Covered by a screen of thirty mesh brass wire,
      (4) Closed by a screw cap when not in use, and—
      (5) Enclosed in a metal box, with a cover that is flush with the surface of the ground and is kept locked when not in use.

Approved December 28, 1905.

SEC. 14. FILLING PIPE.

The filling pipe shall be—

1. Made of two-inch or larger wrought iron pipe, with—
   a. Heavy cast iron fittings, and—
   b. Screw joints made with litharge and glycerine;
2. Provided with screens of thirty mesh brass wire,
   a. One at or near the tank connection, and—
   b. One just below the filling cock or valve;
3. Closed at the intake by a filling cock or valve, the opening of which shall be closed by a screw cap when not in use;
4. Connected with top (or with valve connecting therewith) and extend down to the bottom of storage tank;
5. Laid at a uniform grade so that it will drain empty in the tank;
6. Carried up and terminate with the intake and filling cock or valve in—
   a. The pump house, or—
   b. A metal box with a cover that is flush with the surface of the ground, is kept locked when not in use, and is more than thirty feet from all buildings; or—
7. Carried up and out of the building and terminate in a covered box of heavy iron sunken at the curb flush with the sidewalk, kept locked when not in use, and in this case the shut-off valve shall be provided with a coupling for attaching the hose of a barrel-wagon, and shall only be used for receiving volatile inflammable liquid from barrel-wagons.

Approved December 28, 1905.

SEC. 15. PUMPS.

Pumps for delivering volatile inflammable liquid shall—

1. If within thirty feet of any building, be located in a fireproof pump house;
2. Have a shut-off valve, with ground key, on the nozzle;
3. Have a check valve between pump and nozzle;
4. Have screw stuffing box for pump rod;
5. Have stuffing box for pump rod higher than outlet of pump.

Approved December 28, 1905.

SEC. 16. PUMP HOUSES SHALL NOT BE PLACED IN CERTAIN LOCATIONS.

No pump house containing an intake, or filling cock, or valve for storage tanks, shall be placed—

1. In a building more than one story high;
2. In a building that has a cellar or basement;
3. In the cellar or basement of any building;
4. In an area between a building and a sidewalk;
5. Under a sidewalk; or—
6. Within the stoop line.

Approved August 2, 1906.

SEC. 17. PUMP HOUSE.

The pump house shall have —

1. No greater capacity than required for—
   a. Handling the volatile inflammable liquid, and—
   b. Storing the safety cans;
2. A cement floor, and in case said pump house contains an intake or filling cock, or valve for storage tanks, said floor must be at least six inches lower than the door sill, but not more than twelve inches below the grade of the ground where located;
3. Heavy galvanized iron drip pans—
   a. One to be kept under nozzle of pump, and—
   b. If the pump house contains an intake or filling cock or valve for storage tanks, one to cover entire floor of pump house.
4. If within thirty feet of a building—
   a. Brick walls at least twelve inches thick,
   b. A brick roof at least eight inches thick covered with Portland Cement mortar, and—
   c. Either—
      (1) An approved brick ventilating flue, or—
      (2) An approved galvanized iron ventilating pipe,
   d. No openings through the walls or roof, except a doorway closed by an approved fire door, but—
5. If not within thirty feet of any building, a pump house may be—
   a. Built of metal,
   b. Ventilated by four metal louvred openings twelve by twelve inches, two at the floor and two at the roof, on opposite sides of the building.

Approved August 2, 1906.

SEC. 18. BRICK VENTILATING FLUES.

A brick ventilating flue shall be used where the pump house is located inside another building and shall—

1. Be built in the wall opposite the door;
2. Be lined with tile pipe, eight by eight inches inside measure;
3. Extend from the floor up to and through the roof of the pump house to at least four feet higher than the roof of the garage;
4. Be capped with an eight-inch or larger, eighteen gauge galvanized iron double goose neck, with openings remote at least ten feet

from windows of higher adjacent buildings;

5. Have an opening—
   a. At the floor, six by eight inches,
   b. At the ceiling, at least four by six inches,
   c. At each end of the double goose neck the full size of the pipe; and—
6. Have all openings protected by wire brass screens not coarser than one-eighth mesh.

Approved December 28, 1905.

SEC. 19. VENTILATING PIPE.

A ventilating pipe shall—

1. Be made of galvanized iron of not less than eighteen gauge;
2. Be not less than eight inches in diameter;
3. Extend from three inches above the floor up to and through the roof of pump house to four feet higher than roof of garage;
4. Be capped by an eight-inch or larger, eighteen gauge galvanized iron double goose neck with openings remote at least ten feet from windows of higher adjacent buildings;
5. Have an opening—
   a. Three inches above the floor, the full size of pipe,
   b. At the ceiling, at least four by six inches,
   c. At each end of the double goose neck, the full size of pipe; and—
6. Have all openings protected by wire brass screens not coarser than one-eighth inch mesh.

Approved December 28, 1905.

SEC. 20. PRESSURE SYSTEM.

Pressure systems for delivering volatile inflammable liquid from storage tanks shall—

1. Be so arranged that the gasoline will return through pipes by gravity to the storage tank when system is drained;
2. Be connected, in a manner that will prevent the spilling of the volatile inflammable liquid, to a drawing-off cock or cocks situate—
   a. At a permanent filling station, or—
   b. In a pump house.

Approved December 28, 1905.

SEC. 21. FILLING STATION.

Filling stations shall be located at least twenty feet distant from the entrance to the garage, shall have a tight, unpierced cement or other approved fireproof floor, graded to a centre, and unconnected with the sewer or drainage system of the building. The floor shall be kept free from volatile inflammable liquid by sponging or swabbing. The room shall be kept free of inflammable vapors, either by natural or by forced ventilation.

Approved July 20, 1906.

SEC. 22. FIRE, LIGHTS, ETC.

No stove, forge, torch, boiler or other furnace, flame, fire, or fire heat, no electric dynamo, motor, hoist, or other exterior sparking electric appliance, and no artificial light (except the incandescent electric light) shall be used or allowed—

1. In a garage, or—
2. In any portion of the building on or below the topmost floor of the garage that is not—
   a. Provided with an entrance on the outside of the building, and—
   b. Separated from the garage by unpierced, approved fire-walls and floors.

Provided, however, that upon application being made the Fire Commissioner may, in his discretion, modify the provisions of the section relative to electric motors and electric

switches in any fireproof building already erected or that may be hereafter erected.

Approved July 2, 1907.

SEC. 23. FIRE AND LIGHTS ON AUTOMOBILES.

All fire and lights on an automobile, or under the boiler of an automobile shall be extinguished before bringing the same into a garage, and shall not be lit while the same is in the garage.

Approved December 28, 1905.

SEC. 24. MOVABLE ELECTRIC LIGHTS AND SWITCHES.

Movable incandescent electric lights in a garage shall be fitted with keyless sockets; all electric switches and plugs shall be permanently located at least four feet above the floor.

Approved December 28, 1905.

SEC. 25. SMOKING PROHIBITED.

Smoking is absolutely prohibited by the Fire Commissioner in any room or place in which a volatile inflammable liquid is kept, or in any room or hall opening into such room or place. A notice in large letters "NO SMOKING" shall be displayed in a conspicuous place and manner on all floors and at all entrances to the garage, and in all rooms and halls opening into the room or place in which a volatile inflammable liquid is kept or in which an automobile carrying a volatile inflammable liquid is kept.

Approved July 20, 1906.

SEC. 26. HANDLING AND USE OF VOLATILE INFLAMMABLE LIQUIDS.

No volatile inflammable liquid shall be—

1. Used in a garage for cleaning or for any other purpose whatsoever other than filling the tanks of automobiles;
2. Allowed to run upon the floor or to fall or pass into the drainage system of the garage;
3. Put into or removed from the tank of an automobile while any light or fire on the same is burning;
4. Carried or kept in open vessels.
5. All volatile inflammable liquids and oils recovered from the oil traps, or by swabbing or sponging up spilled liquid shall be placed in an approved safety can of not over five gallons capacity. And all quantities in excess of five gallons shall be returned to the underground storage tank or removed from the premises forthwith.

Approved July 20, 1906.

SEC. 27. SAND SHALL BE KEPT ON THE PREMISES.

Sand shall be kept—

1. In approved fire buckets, for fire-extinguishing purposes only;
2. In convenient receptacles, for use in absorbing waste oil on floors;
3. In bed or metal drip pans under each automobile kept on floors that are not fireproof.

Approved December 28, 1905.

SEC. 28. WASTE CANS.

Self-closing metal cans set firmly on four inch legs shall be kept on all floors for the purpose of holding all inflammable waste material.

Approved December 28, 1905.

SEC. 29. CALCIUM CARBIDE.

Calcium carbide shall be in air-tight metal packages, which packages shall be kept at least six inches above the floor in a water-tight container provided with a securely fastened cover.

Approved December 28, 1905.

SEC. 30. WEEKLY REPORTS OF DELIVERIES OF VOLATILE INFLAMMABLE LIQUID REQUIRED.

Every licensed vendor of volatile in-

flammable by-products of petroleum shall render to the Fire Commissioner each week a statement, verified as to its correctness by an affidavit, covering deliveries for the week to points within the city. The report shall include all deliveries of such liquid in quantities of five gallons or more; and shall be in detail as follows:

(*a*) Date of delivery;
(*b*) Name of buyer;
(*c*) Point of delivery;
(*d*) Number of gallons, name, and gravity of liquid.

Such statement shall be on form provided by the Fire Commissioner, and must be delivered by mail or messenger not later than the second business day in each week.

Approved December 28, 1905.

SEC. 31.

It is hereby provided that the Fire Commissioner, in his discretion, may excuse any garage now constructed from a literal compliance with these rules.

Approved July 27, 1906.

SEC. 32.

For private garages, where no inflammable liquid is kept other than in the tanks of automobiles, and where the fuel tanks of the automobiles are neither opened, emptied nor filled on the premises, the Fire Commissioner may, in his discretion, issue permits limited to such keeping of automobiles, subject to such requirements as he may deem fit.

Approved February 7, 1907.

GARAGE FOR MR. ALEXANDER PANTAGES, SEATTLE, WASH.
Wilson & Loveless, Architects

Garage Door Hardware

WITH the development of a distinct style of architecture for garages, there has sprung up a new school of hardware especially designed and developed for garage use.

For the entrance to the garage experience has established one rule: the main double doors should swing out on hinges. This is the only way to have doors close tightly and to secure an entrance which is weather and draft proof. No space is wasted in operating the doors; hinges never get out of order or require adjustment; a swinging door is the easiest to open and shut; hinges cost less than any other device for opening a door, and the use of special garage hinges adds materially to the architectural effects of the entire garage, besides being the best device known for the opening of garage doors.

The Stanley Works Garage Hinges are especially designed for garage use. The long, ornamental leaf is fastened on to the door's surface; the pad is mortised into the frame. While the doors fit snugly like the front doors of a residence, you are securing the leverage power and long-gripping surface of the corrugated ornamental leaf.

Not only are these hinges the most adaptable for garage use, but they are the strongest hinges of any kind made. The joints are equipped with Stanley's ball-bearing washers. Your doors will not swing on hinges, they will swing on ball-bearings. Ball-bearing washers keep the hinges from wearing down and insure smooth, noiseless and dependable action for the door itself and for your lock or latch.

That the doors, in opening, can clear a frame of wood or brick Stanley's garage hinges are made with an offset. The hinges can be had in three stock sizes, measured by the length of the ornamental pad—12", 24" and 36" long. The 36" size can be had in two styles—with the 1 1/16" offset for wooden garages and with the 2¼" offset where the doors have to be thrown around a brick or concrete wall.

Stanley's garage hinges are made of cold rolled wrought steel. Those finished in Z-J1 are sherardized—a zinc coating process which prevents rusting—and then coated with a dull japan. They can be had, however, in any standard finish.

Stanley's No. 1457 garage door hinge comes in the three sizes mentioned above.

Stanley's No. 1459 is a 36-inch hinge with a 2¼-inch offset for brick garages.

These hinges are made right and left hand. The 36-inch hinges are countersunk for either lag screws or carriage bolts. These specially designed garage door hinges are proving to be most satisfactory for garage use because of their extra strength, wearing qualities, special adaptability, inexpensiveness and artistic design.

The Stanley Works have perfected a garage door holder which prevents the slamming of garage doors. This holder is a wrought steel arm which holds back the door. It is applied at the top of the door, out of the way, and is operated from the inside of the garage. Stanley's holder prevents heavy doors from slamming and doing damage to the automobile or to the doors themselves. Throwing the door open starts the action of the holder, which locks rigidly when the door has completely opened. A pull on the chain releases the lock and starts the closing swing of the door. It can be applied to doors with curved tops as well as straight tops or lintels. They are strong in construction, easy to apply and simple to operate.

Stanley makes two kinds of holders, one locking by friction—Stanley's No. 1775, and one locking by gravity—Stanley's No. 1774. They are both made in finishes to match the garage door hinges.

GARAGES AND MOTOR BOAT HOUSES

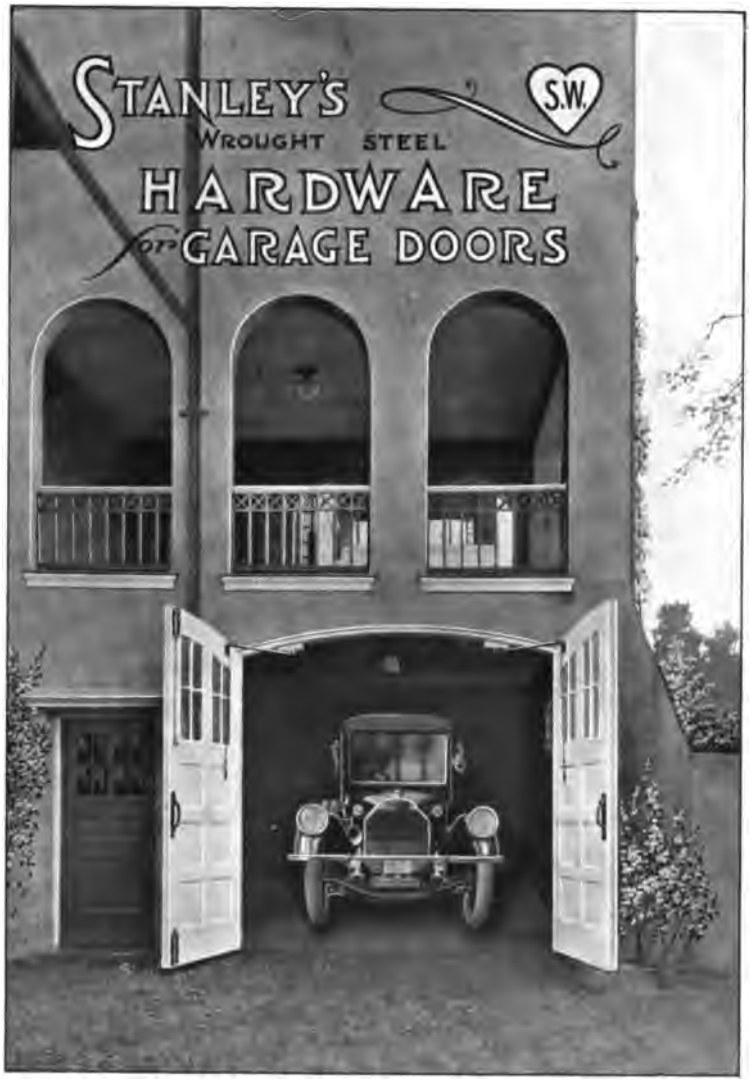
The most satisfactory device for bolting garage doors is Stanley's wrought steel garage cremone bolt. By turning the iron lever handle the doors are securely bolted, both top and bottom. These bolts are made in five stock lengths, but each bolt can be adjusted at ¼-inch intervals to six inches beyond nominal sizes of 7, 7½, 8, 8½ and 9 feet. Once the bolt is applied this adjustment cannot be tampered with or get out of order. Where the strain comes, both top and bottom, the bolt is doubly re-inforced. All parts are sherardized.

The Stanley Works makes an extra heavy wrought steel garage door latch and pull of large, snug, comfortable design to match the hinges and furnished in the same finishes.

Besides these garage door hinges, holders and cremone bolts, the Stanley Works manufactures a special garage chain bolt, foot bolt, safety hinge hasp, and several different thumb latch sets for garage use.

The Stanley Works publishes a booklet for architects on garage hardware, which they will send on request from any architect, specification writer, or builder.

How Can We Hang Those Heavy Double Garage Doors?



Permit the oldest maker of Wrought Steel Hardware to offer you a few suggestions regarding your garage problems.

The helpful ideas to be found in The Stanley Works booklet on specially designed garage door hardware will repay you many times for reading it.

This booklet is a text on builders' hardware for garages.

Sent gratis.

Why not write for your booklet today?

STANLEY S.W. WORKS
NEW BRITAIN CONN. U.S.A.